FIRST AERO WEEKLY IN THE WORLD

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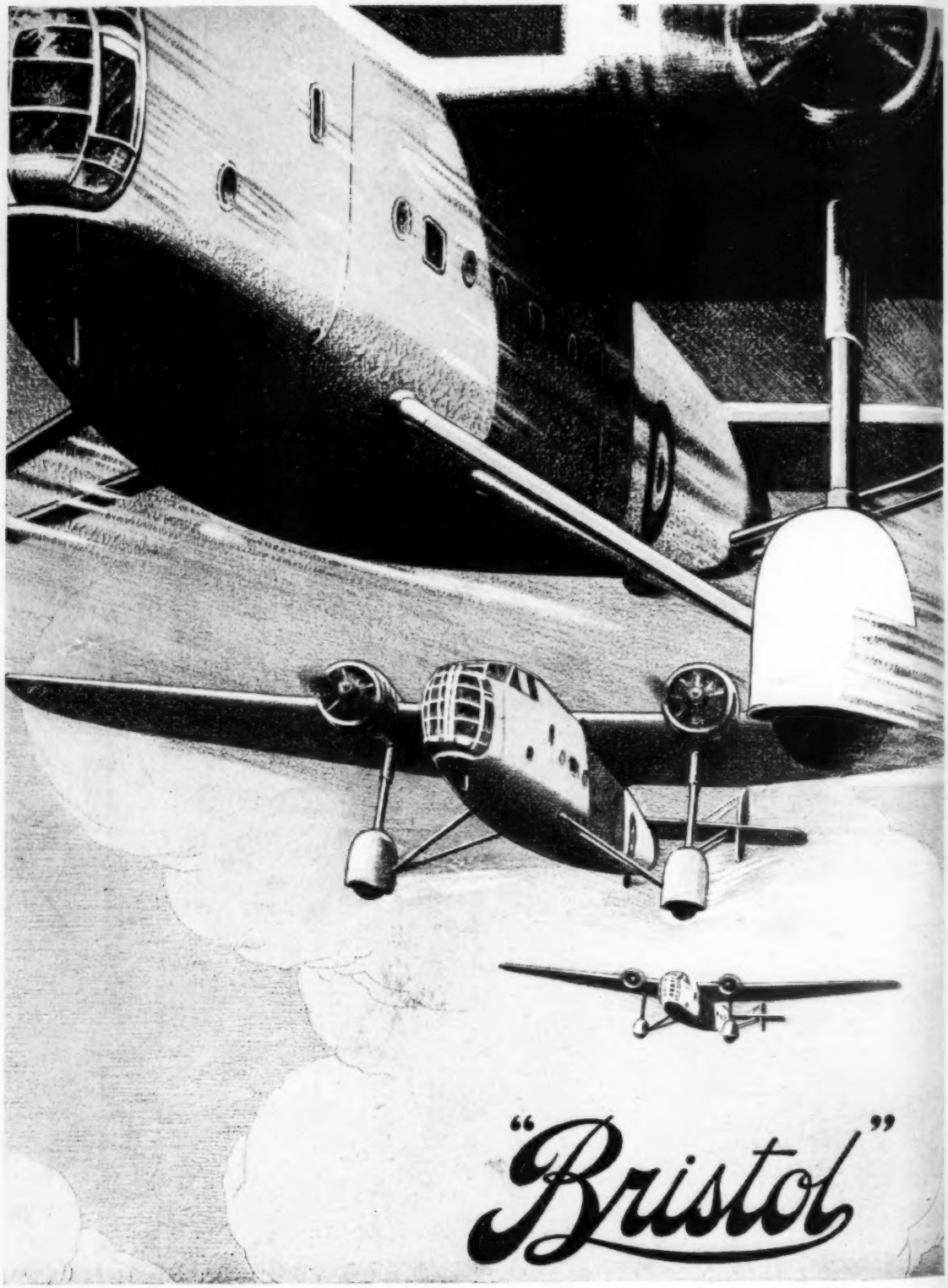

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The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Looking Ahead

AIR expansion has for some time past filled the thoughts of every person who fears that the air raids experienced during the Great War may be multiplied in the next—if next there should unfortunately be. The progress of the expansion of the so-called Metropolitan Air Force has inspired wordy debates in the House of Commons, and so absorbing is the interest taken in this subject that no one has yet indulged in any speculations as to what ought to happen after the present programme has been completed.

It is right that all energies should be devoted to the matter in hand, but that does not mean that it would not be wise to look ahead and consider what our next step should be. The present programme provides for a very large increase in our Home defences, a considerable increase in the Fleet Air Arm and a modest addition to the number of squadrons overseas. The Fleet Air Arm must always be what the Admiralty desires it to be, and perhaps the Lords of the Admiralty will soon take over full responsibility for that arm. The other two sections of the expansion programme are of local concern, tied mainly to the countries in which the squadrons are stationed. We would raise the question: Is that enough for our needs?

The Air Ministry and its spokesmen frequently harp on the mobility of the Air Force and on the power which that mobility confers. They can give instances such as the rushing of transport aeroplanes from Iraq to India at the time of the Kabul evacuations. Certainly the ideal is that the Air Force ought to be mobile, but the fact that aeroplanes can fly fast does not of itself confer mobility on the Force. The Fighter Command, for instance, is tied firmly to Great Britain so long as there is any remote chance that raiders may attack Britain.

We may well ask if the Bomber Command is any more mobile. If there is war, or even a chance of war, in Western Europe it would be rash to assert that we could afford to send even one group of the Bomber Command far away from our shores. Most probably every bomber squadron would be needed, or would have to be held ready, to bomb military targets in the enemy's country; and also the Bomber Command would have to work closely with the Coastal Command in guarding the narrow seas. The essence of bombing efficiency is continuity of effort on selected important targets. Occasional sporadic bombing of many targets is a waste of effort. If an enemy port or railway station is to be kept out of action, no chance or time must be given to the enemy to repair the damage done in the first raid. There would therefore seem to be quite as much work before the Bomber Command as the existing four groups in that Command could conveniently tackle. In that case the Bomber Command is no more mobile than is the Fighter Command.

Our Next Need

It would seem that our next need is a special strategic Air Command which would be available for duty anywhere in the Empire, or outside it, where there was need at a particular moment. If, for example, the Army sent an expeditionary force to some distant theatre of war it would need help from the R.A.F. Of course, it would take with it the five Army co-operation squadrons, whose main work is reconnaissance and spotting for the artillery. They could not undertake continuous bombing of the enemy's lines of communication, and in any case their machines are only in the same class as light bombers. The Army would need light, medium, and heavy bombers, and most probably it would need fighters, too. When Army manœuvres are held in this country so many squadrons of fighters and bombers are lent to the Army by the Metropolitan Air Force, but, as has been explained above, in time of war none of those could be spared for specific Army work.

The despatch of a land expeditionary force would not be the only case in which a truly mobile branch of the Air Force might be needed. There might be a sudden call for air action in some distant part of the world simultaneously with a threat to the shores of Great Britain. Perhaps it might be possible to mobilise some of the overseas squadrons to deal with such an emergency, and perhaps it might not. In any case, their numbers at present are small, and they would need

reinforcement. The number of squadrons permanently stationed overseas might perhaps be increased, and in some cases, such as Singapore, an increase is obviously desirable. But the general air reserve for the Empire ought to be kept in the British Isles, always ready to move at short notice to any theatre where it was needed. Until we have formed such a general air reserve the mobility of the Royal Air Force is an expression which is only partially borne out by the facts. Real mobility is an ideal which must be realised as soon as we are able to give our full attention to the subject.

Trial By Fire

MISFORTUNES have a way of bringing people together. The calamity which, in a few minutes, robbed Germany of her magnificent airship has caused very heartfelt sympathy in Great Britain, not only with the relatives of those who perished in the disaster, but with the whole German nation. One by one the other nations have had to abandon airship work; France, Italy, the United States and Great Britain have all suffered grievous losses, and all have in turn cried "enough." After a marvellous record for safety Germany had come to be regarded as immune from those catastrophic misfortunes which had cost the other nations so dearly in lives and treasure, and there was a general feeling that the unbroken accumulated experience of German airship technicians, dating back to the very first airship ever built by Count Zeppelin, was the best possible guarantee that whatever befell others with less experience, Germany was the one nation in the world which had won her right to be considered the unchallenged leader in this particular branch of aviation.

One result of the Hindenburg tragedy is that, now more than ever, does it rest with Germany whether airships are to disappear completely or whether they are to arise out of the ashes of the Hindenburg, safer, more comfortable, more economical and in every way better than before. That Germany has the technical qualifications for continuing the work no one doubts. Whether or not she does in fact continue on the necessary scale will have to be determined largely by financial considerations; and that is where the rest of the world could help.

It would be a fine gesture if an international conference could be called to discuss the matter, and if that should decide, after obtaining all available evidence, that airship operation over ocean routes holds out a fair promise of success, a large international company could be formed to finance the building and operation of airship services. To be a success it would be necessary to set about it on a large scale, and the international basis appears to be the only one which would ensure this. National *amour propre* need not prevent such a course.

GOING HOLLYWOOD: Northrop attack machines of the U.S. Army Air Corps (Pratt and Whitney Twin Wasp Junior engine with gilled cowling) over Californian orange groves. These machines are intended primarily for ground strafing and apart from one free and four fixed Brownings are equipped for the dispensation of chemicals.

The Outlook

A Running Commentary on Air Topics

The Hindenburg

UNTIL the boards of inquiry have completed their task there can be no certainty about the cause of the *Hindenburg* disaster; and even the boards may not be able to arrive at definite conclusions. From the cabled accounts of the catastrophe, however, it does appear likely that a discharge of static electricity may have been responsible. The airship had been cruising around for some time, waiting for thunderstorms to clear away before attempting the mooring. During that period she may frequently have been almost stationary, and the ventilation of the air space between gas bags and outer cover may not, as a result, have been as thorough as it is when an airship is travelling at her normal cruising speed.

While approaching the mooring mast the airship would probably be valving hydrogen, and the combined result may well have been that a certain amount of combustible mixture of hydrogen and air was present near the surface of the envelope of the hull. A spark caused by the accumulation of static electricity as the airship neared the ground might thus start the fire. To us this seems a much more likely explanation than the theory of sabotage which was freely expressed immediately after the accident. In a broadcast talk to German stations last week Dr. Eckener admitted that at first he inclined to the sabotage theory, but that as a result of more recent information he had come to the conclusion that a static discharge was a more likely cause.

The Diesel Position

AN article in this issue of *Flight* by Capt. Andrew Swan, of the Royal Aircraft Establishment, summarises admirably the position of the diesel engine as far as it concerns heavier-than-air craft. The outlook is not bright, but the time may well come when it becomes necessary, in spite of certain disadvantages, to go on with research and development. For airship work the diesel has proved its value, although the *blaugas* used by the Germans cannot, apparently, be used in diesel engines burning heavy oil. Progress has, however, been made with water recovery from the exhaust vapour, so that buoyancy may be maintained in this manner instead of by the use of *blaugas*.

In airship work the diesel is, of course, working under exceptionally favourable conditions. To begin with, specific weight is not quite so important as in heavier-than-air craft, so that the engine can be made a little more robust. Secondly, the installation in an airship leaves the engines more accessible during flight, and adjustments can be made in time to prevent minor derangements from developing into complete breakdowns.

Helium

MANY will feel that had the *Hindenburg* carried petrol instead of oil fuel, the loss of life might well have been a good deal greater. Obviously, had the gas bags been filled with helium instead of hydrogen no fire would have occurred, and it is natural that the combination of helium gas with heavy-oil fuel should at once come to mind as an obvious safety measure.

There are several reasons which raise obstacles in the way of an immediate adoption of helium. So far as is known, helium is found in nature in a very few places only, America has a considerable supply, and certain parts of Canada are possible sources of future supplies, but the gas must necessarily be expensive, and as a percentage is bound to be lost through leakage, no matter what precautions are taken, the question of cost is closely bound up with the economics of airship operation.

The difference in weight between helium and hydrogen is such that the former will give only approximately 90 per cent. of the lift of hydrogen. Instead of 70 lb. per 1,000 cu. ft., helium will lift but a little over 60 lb. In an airship of seven million cu. ft. that difference will have important effects on pay load or range. Nevertheless, unless the chemists provide us with a synthetic gas having similar qualities these drawbacks will have to be faced.

In a leader this week international co-operation is suggested. One form which this might take would be for Germany to supply the airship structure, the United States the helium, and perhaps Great Britain and a few other countries the bulk of the money. By pooling resources in this way the possibility of safe airship travel in the immediate future is obvious.

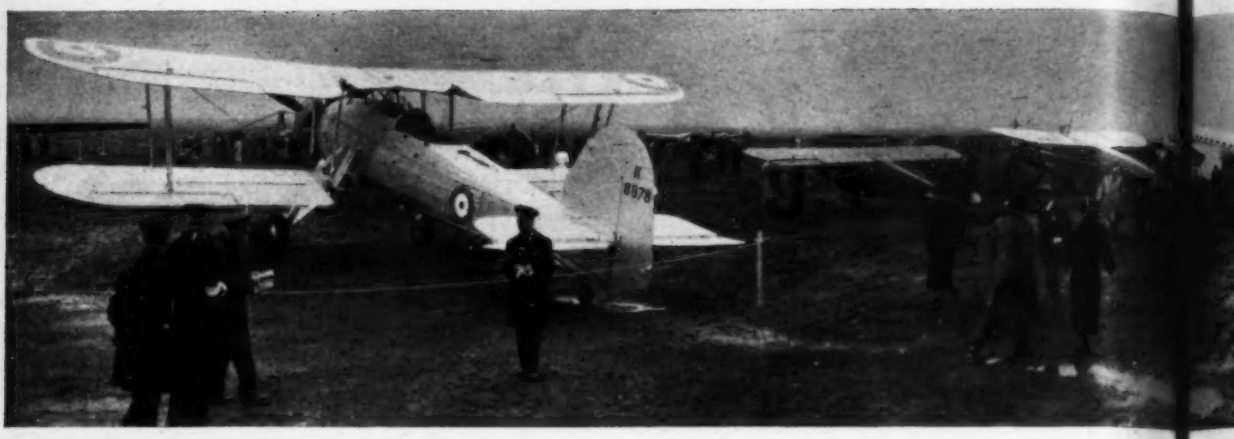
Aircraft and the Navy

THE demand of the Navy for full control of the Fleet Air Arm is so obviously a plea for better co-ordination of defence (provided that supply of aircraft and elementary flying training are left in the hands of the Air Ministry) that it is hard to understand the objections raised by some air partisans. But when the Naval claim is extended to control of coastal air squadrons the matter is not so clear. This complex problem is, however, considerably clarified by the editor of the 1937 issue of *Brassey's Naval Annual*, Rear Admiral H. G. Thursfield. "There is nothing to be said," he writes, "for the maintenance of the dual system in the Fleet Air Arm; but equally, if the Air Staff were to admit that a quota of fully sea-trained shore-based aircraft is indispensable to the discharge of Naval responsibilities in the narrow seas, and would undertake to provide it, there would be no adequate ground for the naval demand for full administrative control of all such units. The true solution of the problem lies in the adoption of a policy lying somewhere between the extremes advocated on the one hand by Lord Trenchard and on the other by Sir Roger Keyes; and it should not be difficult to reach it if the disputants could discard prejudices and each endeavour to understand the other's case."

The plea to discard prejudices is well-timed, though perhaps it is asking more than official humanity is able to give; but, fortunately, there is now a Minister for Co-ordination of Defence, whose business it is to settle such matters.

Attack and Reconnaissance

REAR ADMIRAL THURSFIELD'S views on the utility of aircraft to a fleet are interesting. Their essential function in action, he holds, is reconnaissance, using the word to include spotting for the guns. Aircraft must find the enemy fleet, and when it is within range must direct the guns on to it. These are services of prime importance. For the aircraft's powers of damaging enemy ships in the course of the action he does not display much respect. Precision bombing from heights of 8,000 to 10,000 ft. is not likely, he says, to score many hits. Dive bombing may score more, but the damage it is likely to inflict will probably not sink a ship. Torpedoes from aircraft are unlikely to inflict damage commensurate with the effort and resources expended on them. Still, he would let the bombers and torpedo-planes do what they can, and if they did succeed in crippling some of the enemy, so much the better. But the gun is the Navy's real weapon, and when the aircraft help to score hits with shells they are of immense help to the Navy.



Heterogeneity at Heathrow : Some of the aircraft on view ; in the foreground is the Fairey Swordfish. In the picture on the right the president of the R.Ae.S., Mr. H. E. Wimperis, is seen with Mrs. Wimperis receiving guests.

THE R.Ae.S. GARDEN PARTY

Pilots and Guests Defy the Weather at Heathrow : Demonstrating Under Difficulties : The Industry's "Indoor Amusements" Do Well

THE term "garden party" suggests (or used to suggest) sunshades, silk hats and strawberries. Last Sunday, at the Royal Aeronautical Society's annual function at Fairey's Aerodrome, it implied gumboots, galoshes and gamps.

Yet, to the everlasting credit of all those modestly anonymous people who stage-manage this notable fixture, it went off—and went off more or less according to programme.

Over three thousand guests, including a great many distinguished foreign visitors over for the Coronation, sheltered in hangar doorways or under accommodating wings. And one by one, penned beneath a 500ft. ceiling, various stout-hearted souls peered forward through opaque windscreens or sideways through smoking cloud and drizzle while they made their aeroplanes do all those things that should be done joyfully beneath a blue sky while sunbeams dance on the cowlings.

In spite of those weeping heavens, too, some fifty widely assorted aeroplanes, only a few of which had arrived the day before, were present on parade. Notes on points of particular interest about this fleet, and a description of the "static" exhibits in the big hangar, appear at the end of this report.

The demonstration programme was opened by Flt. Lt. J. B. Wilson, with the B.A. Double Eagle (two Gipsy Majors), and as this unconventional but graceful "inverted gull-wing" monoplane came and went in the murk, now fast, now slowly, flaps-down, one realised just how vile the weather conditions really were from an aeronautical point of view.

Of the eight modern military machines listed, only the Fairey P.4/34, Swordfish and Vickers Wellesley were present. The absentees were the Bristol Blenheim, a Hart fitted experimentally with a Mercury VIII in a gilled cowling and Rotol magnesium constant-speed airscrew, the Fairey Battle, Westland Lysander and Bristol Bombay.

Having appeared in public on several occasions the Swordfish was not demonstrated but was available for exterior inspection as an example of the latest torpedo-spotter-reconnaissance machine to go into service with the Fleet Air Arm, leaving the Fairey "P.4" and the Wellesley to show the assembly something of the capabilities of modern Service aircraft.

F./O. Quill was deputising for Captain J. Summers as the demonstrator of the Wellesley, which, in its sombre coat of green, dark-earth and black "shadow-shading," seemed some grim associate of the surrounding murk. Powered with one of the new Pegasus XXs, supercharged to develop 925 h.p. (max.) at 10,000ft., and delivering 835 h.p. for take-off, the Wellesley has speed and agility despite its 73-foot geodetic wings, which, as Mr. Commentator Courtenay never seemed tired of observing, present a glider-like appearance.

The independently retracting wheels added to the bizarre fascination of the big bomber, tucking themselves up into the wings as the machine sailed quietly and steeply up into the grey pall. The Wellesley showed its obedience to F./O. Quill as convincingly as the cloud ceiling would allow, then made a somewhat cryptic exit into the grey gloom. Later the big Vickers performed again, its pilot taking advantage of slightly improved conditions to reveal the readiness with which it responded to the controls at swift and sluggish pace.

Far and away the fastest machine present, the elegant blue-grey Merlin-engined Fairey P.4 light bomber seemed

to ooze performance. Interspersed with the prevalent ecstatic eulogies one overheard remarks on the outboard Vickers gun in the starboard leading edge, the external bomb racks and the difficulty in detecting the rivets on the upper wing surfaces.

Flt. Lt. Christopher Staniland "up," this newest Fairey projectile roared away into a sky which would have appalled lesser mortals, made a circuit or so and came rolling across the threatening gloom in a most dramatically defiant manner. Staniland fans were not disappointed. On one occasion the indefatigable "Chris" approached with the Merlin wide open, throttled back sharply, eased the "P.4" on to its back and rolled out in awe-inspiring silence.

After standing all afternoon with its cowlings propped wide up to allow the curious to inspect "The smallest and lightest 135 h.p. engine—280 lb." (*vide* accompanying notice), the Miles Whitney Straight with Maya engine was taken off by Flt. Lt. ("Schneider") Atcherley, who proceeded to show just what that claim implied.

Mr. Brian Allen followed with the Tipsy monoplane (34 h.p. Sprite), giving at an average height of ten feet a display that was crazy-flying in all but name. If not graceful, his violent alternations between opposite vertical turns, his wing-rockings and his swish-tailings were at least excellent testimony to both the manœuvrability and the strength of this pretty little single-seater.

The next turn was that extremely unconventional Dutch visitor, the Scheldemusch pusher biplane (40 h.p. Praga flat twin), with its three-wheel undercarriage, ultra-short tail cocked high aloft even when on the ground, and Handley-Page-slotted wings. Having disabused our minds of the idea that we were watching the Hordern-Richmond (in spite of the loudspeaker's contention to that effect—one of Mr. W. Courtenay's few lapses in an otherwise characteristically informative commentary) we settled down to enjoy a quite remarkable demonstration.

The designer, Mynheer Slot (felicitous name!), took every imaginable sort of liberty with it—or what would have been liberties with an orthodox aeroplane, pointing his nose almost vertically skyward straight off the ground, the subsequent stall instantly becoming an innocuous sink of a few feet before flying speed was regained. It was completely convincing.

A Light Twin

Next, Mr. Field-Richards showed how sprightly is the cabin two-seater Porterfield on the 70 h.p. of its Le Blond radial, and Mr. E. G. Hordern charmed everyone with the quiet agility of the three-seater Hordern-Richmond Autoplane (two 37 h.p. Continental flat fours), which is one of those aeroplanes which look so much prettier in real life than they do in photographs. And if anyone doubted the merits of its unconventional control system, in which a wheel does the work of the rudder bar, he had only to watch Mr. Hordern's straight flight followed by a turn, the whole thing carried out at an altitude of some three feet, first the fuselage and then the starboard wing-tip unerringly maintaining that height above e th sward.

Tea over, and K.L.M.'s Douglas D.C.3 and the British Airways Lockheed Electra having taken their respective booming and snarling departures, Mr. Kirwan in the Aeronca and Mr. Kronfeld in his new Super Drone gave a duet, the latter displaying his "hands off" technique. This latest Drone, with 32 h.p. Carden engine, differs noticeably from its predecessors, principally in having a roomier cockpit and an N-strut mounting arrangement of centre section and engine housing.

This photograph of the Scheldemusch is unusual in depicting an aeroplane with three slots, one on each wing tip and a third at the controls! Mynheer Slot, the designer, was the pilot.

Mr. R. A. C. Brie gave his now famous display on the C.30 Autogiro (140 h.p. Genet), but for once this remarkable machine's performance was overshadowed (and Mr. Brie would be the first to forgive that statement) by the first public appearance of the Hafner Gyroplane (85 h.p. Pobjoy), in the hands of F/O. Clouston. From an up-and-off start almost suggestive of the jump-start Autogiro, the Hafner proceeded to display the manœuvrability which its independent-incidence rotor system bestows. F/O. Clouston made a long series of steeply banked and really tight turns, and then proceeded to do more or less the same thing with one wheel on the grass. Everyone must have been convinced that the Hafner A.R. III is anything but a flash in the autorotative pan.

Mr. Hordern returned to the fray with one of his typically restrained and quiet demonstrations on the Heston Phœnix—which is just the way such a nice aeroplane should be demonstrated—and Mr. Kronfeld did the kiwi act with his ground trainer.

Cheerful in spite of the rain—some personalities at the Garden Party. (Left to right) Mr. George Dowty admits an undercarriage failure; Mr. Handley Page with Dr. and Mrs. Lachmann; Messrs. Preston and Folland, whose teamwork is finding new outlets; and Mr. Martin (of the Martin-Baker combination) with Lt.-Col. Darby.

From a standing start : F/O. Clouston takes off the Hafner Gyroplane. He left the spot where the patch of grass is of lighter colour.

The promised Sopwith Camel remained in a quiet corner, clambered upon by young enthusiasts reared on air-war history, but another historical exhibit, Mr. R. O. Shuttleworth's 1909 Bleriot, excelled itself. The machine was one of those originally constructed under licence by Humber's, and fitted with the 25 h.p. Y-type Anzani. Aided by just the right sort of gentle wind and the fine expanse of smooth aerodrome, Mr. Shuttleworth got the old-timer off in grand style, and flew several circuits at a height of thirty or so feet. He told us afterwards that this was the first time he had managed to achieve anything better than short "straights" with this machine, and said that a genuine 1909 airscrew, replacing the modern one previously used, had greatly improved the performance.

Spectators rubbed their eyes when a sister-ship appeared—another renovated 1909 cross-Channel-type Bleriot. A "period" copy by Zander and Weyl, this was flown by Mr. R. G. J. Nash, and, although it had not quite the agility of Mr. Shuttleworth's mount, it very definitely flew.

There was something very noble, and not in the least comic, about the spectacle of these veterans in flight. Somehow it rolled back the pages of aviation history, and its trials and sacrifices, in a way in which no written word or picture could ever do.

In a dank and premature dusk the final item was staged—a demonstration by Bell's Asbestos Company of their fireproof curtain which can be rushed into place to isolate a burning aeroplane from its neighbours in a hangar or aircraft park. Atmospheric conditions considered, the fire was by far the most comforting spectacle of the afternoon.

THE "STATIC" DISPLAY

EVEN if the weather had been more kind and the flying display, as a result, more extensive, the "static" exhibition staged in the Fairey hangar would, undoubtedly, have attracted a great many of the visitors, for the exhibits differed from the ordinary run of these things in being quite obviously designed for the benefit of "those who know."

* * *

Some idea of the amazing manner in which tube manufacturers are meeting the very difficult and exacting requirements of the aircraft designer could be formed from an inspection of the examples of unusual tube manipulation shown on the Accles and Pollock stand. What made the exhibits particularly interesting was the method of showing tubular components partly sectioned. The undercarriage legs of the Gloster Gladiator, for instance, have a maximum diameter near the centre of the leg and taper to a much smaller diameter at the ends. The gauge of the tube also varies, the taper in gauge being obtained by machining the outside of the tube. Another interesting exhibit was a "flexible" engine mounting ring in chrome-molybdenum steel for the Blackburn dive bomber.

* * *

That remarkable progress has been made towards a material suitable for the primary structure of aircraft was disclosed on the stand of Aero Research, Ltd., of Duxford. Known as Gordon Aerolite, a brand new material shows very remarkable properties. One of Dr. de Bruyne's synthetic resins, this material has a Young's modulus of 5.93×10^6, a specific gravity of 1.37 and a tensile strength of 17.7 tons/sq. in. If one takes as an efficiency figure the ratio of tensile strength to specific gravity, Gordon Aerolite shows up well against other structural materials, with a ratio of 12.9 compared with 10.0 for spruce and 11.4 for high tensile steel.

Aerolite synthetic glue is another of Dr. de Bruyne's materials which seems likely to have many applications. It can be mixed with a slow-setting hardener which allows the glue to be used at ordinary room temperatures for up to four hours after mixing. Dr. H. C. Watts, of the Airscrew Co., Ltd., has carried out some tests on standard test pieces cemented together with Aerolite synthetic glue. The average strength of eight tests gave a figure of 1,426 lb./sq. in. when the glue was applied immediately, and 1,300 lb./sq. in when it was applied four hours after mixing. These were the "dry" figures. In the "wet" tests the corresponding mean figures were 1,522 and 1,325 lb./sq. in. respectively.

* * *

Although the variable-pitch airscrew is by now a fairly familiar sight on modern aircraft, the demonstration specimens on the De Havilland stand attracted much attention, the part-sectioned hubs enabling the onlooker to see exactly how the mechanism works. The sectioned governor unit for the constant-speed airscrew was new to many.

* * *

Commander Dove, R.N., was surrounded by an admiring and enquiring crowd on the stand of Aircraft Components, Ltd., where a large demonstration outfit showed the working by an engine-driven pump of such components as retractable undercarriages, flaps, wheel brakes and machine gun firing gear. A single "gated" control lever operates all these items when moved into the appropriate slot in the gate. The new Dowty "nutcracker" strut includes a special system of locking, and a new automatic short-circuiting valve in the hydraulic system reduces the time necessary for the undercarriage to extend.

* * *

Many visitors to the static exhibition had not previously had an opportunity to see the Hobson master control carburettor, which is now being used in large numbers on R.A.F. aircraft. This instrument forms a safety device which prevents the pilot from mishandling his engine control levers and thus protects the engine against excessive boost pressures and incorrect mixture strengths for the power being taken from the engine under any given conditions. The great advantage, from the service personnel point of view, is that the master control carburettor relieves the pilot of several of the many things which he has to remember in a modern service aeroplane.

* * *

The man whose work lies on the practical rather than on the theoretical side found much to interest him on the Tecalemit stand, where specimens of that firm's lubrication equipment were demonstrated. Of particular interest was the new high-pressure hydraulic pump. It is described in detail on p. 488.

* * *

Imitation Pegasus master rods formed the pillars for the roping-off of the Bristol stand, where the sectioned Pegasus with its D.H. airscrew hub turned over for the benefit of an ever-present crowd. The "works" of a Pegasus, reflected in the bottom of their case, were a Mecca for constructional connoisseurs The Vickers Wellesley, parked without, provided an opportunity for the inspection of a Pegasus XX installed.

* * *

Anything gyroscopic can be guaranteed to entertain laymen and technicians alike, which fact, combined with the proven excellence of Sperry equipment, ensured a continuous congregation before this concern's exhibits. The 60-lb. automatic pilot, directional gyro and gyro horizon were available for intimate inspection, together with the venturis and other components which make the wheels go round so beneficially.

* * *

The regret at the absence of some of the aircraft due to appear was, to some extent, mitigated by the comprehensive selection of models shown by the Model Transport Co., Ltd. A reproduction of the piano room of the ill-fated *Hindenburg* included a miniature copy of the *Valse Triste* on the piano and *Flight* on the table.

* * *

Among the exhibits of Smith's Aircraft Instruments, Ltd., was a shallow retractable Harley landing light said to have a 500-yard beam. Its depth is only 4¾in. and the weight 7¾lb.

A celluloid Dalton computer giving rapid conversions and solutions to navigational problems was shown and there was a working example of the Holmes repeater compass, which has its filament-damped magnetic directional element placed in the tail or other distant part of the aeroplane, well away from engine disturbances, magnetic or vibrational.

For many who had retained the boyish instinct to "look inside the works," a stripped Rotax starter, generator and magneto were of special interest.

The wings of the new Kronfeld Drone afford welcome shelter from the rain.

The nature of the Palmer tyres proven construction was evident in a section of a tyre which, together with brake controls, brakes (available with hydraulic or pneumatic operation), and a dismantled tail wheel gave an excellent idea of the Palmer contributions towards present-day aeronautics.

* * *

It was stipulated that no engine could be exhibited unless sectioned, so the Kestrel XVI and Merlin models were absent from the Rolls-Royce stand. There was, however, the " cut-away " 600 h.p. Kestrel VI which is still in great demand.

* * *

Parts for " H "-shaped engines formed the nucleus of the Napier display, which included a Robertson oil cooler (manufactured by an associated company) destined for a Pegasus in one of the Short Empire flying boats. A case of Rapier components really drove home Napiers' superb design and workmanship, which has given Great Britain a flying start over other nations in the production of multi-bank in-line engines.

* * *

The action of the P.B. Deviator or stabilised gyroscope was illustrated on its makers' stand by a model, as was the functioning of the successful automatic control by the same manufacturers. The total weight of the automatic control was given at 60 lb., which is a creditable figure for such an efficient piece of apparatus. A " portable invisible light detector " operating on a longer wavelength than has hitherto been possible (thus constituting, it was claimed, the basis of any directional control for use in fog) was unfortunately not shown.

* * *

Short and Mason, Ltd., had hit on the happy idea of putting some of their more historic devices on show. There was, for example, an altimeter from the old Mayfly and one for the Hon. C. S. Rolls. A record made by a portable altigraph of Flt./Lt. E. L. Moles' recent execution of sixty-seven loops in a glider over Almaza was a particular attraction.

* * *

Although not listed to exhibit, R.T.E. presented their ARE 100 equipment, which provides, among other things, visual and aural direction finding and homing indication.

* * *

The smoke trail wind-indicator licensed from Ahrens by General Aircraft was shown—*not* working—in the display hangar. The apparatus is fed by gravity with crude oil, and when sunk in the ground causes no obstruction.

Avery's weighed in with a self-indicating universal test machine, direct-reading hardness testing apparatus and impact-test gear.

* * *

Examples of the two-shoe servo brake were shown by Bendix, Ltd. The hydraulic brake described in *Flight* of October 29, 1936, and several sizes of the mechanically operated model were to be seen partly sectioned or as components. The principle of the two shoes with the special link connection to convert rotational energy taken up by the first shoe to braking power on the second could be clearly seen and understood.

* * *

Chief among the Lockheed display were the "six-ton" undercarriage jack for the Ensigns and the remote control panel with a single transmitter and grouped selector levers. Mechanical locking of each unit is incorporated in the system and a common indicator shows the position of each auxiliary.

* * *

The fitting of an exhaust gas analyser as a standard instrument, to enable the pilot to secure mixture adjustment for the lowest efficient fuel consumption during flight, is now becoming very common on commercial aircraft. The latest complete Cambridge Mixture Indicator installation was to be seen.

* * *

On the Dunlop stand a revolving tail wheel with half the tyre made of Ecta electrically conducting rubber demonstrated its property of discharging any static electricity acquired by an aeroplane. A brake system and machine gun operating gear were also to be seen; a dual relay connected to the rudder bar gives differential braking and a separate supply line via a firing button and spade grip on the control column makes the system very suitable for multi-gun aircraft.

* * *

A modified form of the Service type P.4 Aperiodic compass, the Husun P.4.L., was on the stand of Henry Hughes and Sons, Ltd., and could be seen to have all the qualities of careful design characteristic of these compasses. An operational temperature range of 100 deg. C.—that is, from +50 deg. C. to 50 deg. C. is provided for.

* * *

As a contrast to the latest aircraft wireless equipment on view at the Marconi stand there was also an early Marconi aircraft set made in 1919 and several antique coherers of about 1900. The original Marconi patent was framed centrally and grouped round it could be seen a fixed anti-icing aerial, a streamlined fairlead, a constant-speed windmill and a rotatable D/F loop.

* * *

Like a pair of large black spirit lamps, two Heston-Toledo landing flares (Airwork, Ltd.) rested unobtrusively on a box. These flares are self-lighting and are designed for dropping from a lorry in the case of an emergency caused by floodlight failure. Illumination and marking-out of an aerodrome can be carried out in about five minutes.

Around the Aircraft Park

Those who could disregard the discomfort of wet feet to the extent of making a really thorough tour of the visiting machines should have seen quite a lot to interest them.

As far as special equipment was concerned, the Standard Radio Phœnix and the Air Dispatch Dragon were probably the most intriguing. The former is already well stocked with radio gadgets, but Mr. Auping, the company's demonstration pilot, apologetically explained that the installation process is by no means complete, and that the finished machine will be a true " flying laboratory." Its flame colour has not been arranged for beauty, but for effectiveness and to make it quite clear to other pilots that the machine is one to be avoided.

The Dragon has been equipped for air-survey work in this country. In addition to a three-axes P.B. automatic pilot, the camera itself has its own automatic stabiliser. From what we hear the tests have proved the layout to be extremely satisfactory.

Among the passengers of the K.L.M. D.C.3 were Mr. Plesman, the managing director of the company, and Capt. H. Spry Leverton, the Croydon manager, who had only just returned from a short period of convalescence in Cornwall—and was looking very fit indeed.

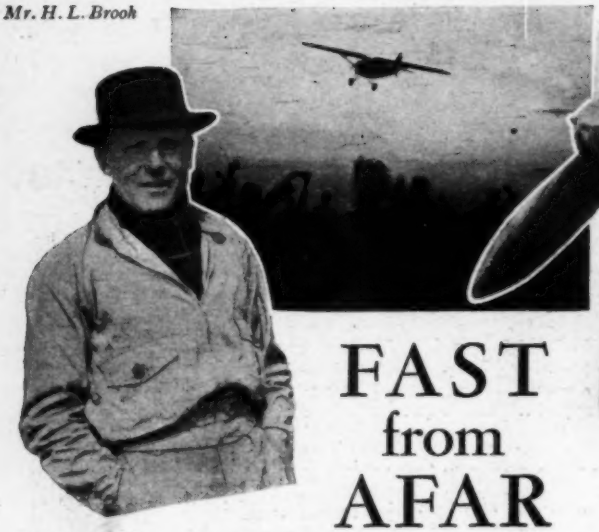
Very few of the spectators can have realised that the Kronfeld Drones (new and old), which arrived in formation, were flown respectively by Mr. and Mrs. Kronfeld

General Aircraft were well represented by three Monospars, and the now well-known ambulance received a great deal of attention from the general public—many of whom must have felt a desire to lie down on the stretcher and rest their wet and weary feet.

Quite the most terrific display was given by the pilot of a Miles Sparrowhawk after the departure of the multitude. We *think* we know who it was, and only a knowledge of this particular pilot's aerobatic skill prevents us from labelling the performance as both dangerous and unnecessary. Steep climbing turns below the level of the tree and hangar tops do not inspire people with anything but a desire to go and seek shelter.

Incidentally, what caused the appearance of the white plumes of smoke, water, or fuel from the wing-tips at certain critical moments during the pilot's display? Great minds among the remaining spectators worked out complicated theories to explain how the fuel, in certain circumstances, could travel to the wing-tips, or how the intense humidity of the atmosphere could have caused the miracle. Feeling fairly certain of the pilot's identity we think that the effect was deliberately planned, and we may see more of it at other meetings. Not, please, *below* the tree-tops, Mr. ——!

Mr. H. L. Brook



Mr. H F. Broadbent

FAST from AFAR

How Mr. H. F. Broadbent came from Australia in 6½ Days by D.H. Leopard Moth and Mr. H. L. Brook from the Cape in 4 days by Percival Gull

IN last week's issue were briefly recorded the successful completion of Mr. H. F. Broadbent's Australia-England flight by D.H. Leopard Moth and the fact that Mr. H. L. Brook (Percival Gull) was well on his way towards achieving a Cape-London record. The latter effort was also successful, and it is now possible to give details of both meritorious feats.

On arrival at Lympne at 6.40 p.m. on Monday, May 3, Mr. H. F. Broadbent had lowered the Australia-England solo record time, held by Mr. H. L. Brook, by 1 day 8 hrs. 55 mins. He managed to sleep for a while during ground stops on the Tuesday and Wednesday nights, and at other times relieved the monotony by reading, but the fact that his aeroplane—which, we are told, behaved perfectly—is a standard De Havilland Leopard Moth with Gipsy Major engine and a cruising speed of about 117 m.p.h., is a tribute to the physical endurance of this young Australian pilot in completing the 9,000 miles from Darwin in so short a time as 6 days 10 hrs. 55 mins., even after a delay at Rangoon due to the weather.

The daily "hops" were as follows:—

Tuesday (leaving Darwin at 7.45 a.m. B.S.T.): Singapore—1,900 miles.
Wednesday: Penang—395 miles.
Thursday: Akyab—1,020 miles.
Friday: Allahabad—750 miles.
Saturday: Bazra—1,850 miles.
Sunday: Cyprus—800 miles.
Monday: Lympne—1,900 miles.

Some of these mileages were made possible only by a considerable amount of night flying. On the last morning Mr. Broadbent left Cyprus early and landed at Rome at 8.21 a.m., within half an hour he was again on his way, covering the last 1,000 miles to Lympne and later to Hanworth, where he landed at 8.15 p.m.

Mr. Broadbent held the outward record to Australia from November, 1935, but this was lowered by the present holder, Miss Jean Batten, last October, her time, on a Percival Gull, being 5 days 21 hours 3 minutes.

Mr. Broadbent's Leopard Moth had every appearance of being almost as good as new when it was wheeled into the Aircraft Exchange and Mart's hangar at Hanworth. Inside the cowling the Gipsy Major engine was as clean as could be expected after such a flight and the entire machine might just have left the dope shop.

Apart from a Sperry artificial horizon mounted on the right and slightly below the normal dashboard, the only non-standard feature was the additional fuel and oil tankage and pump arrangement. Behind the pilot's seat were large rectangular tanks holding in all some 64 gallons, while the normal wingroot tanks held a further 24 gallons. The additional oil tank mounted beside the pilot had a hand-pressure pump.

Among the components and items of equipment which contributed to the success of the Leopard Moth's flight were:—

Hobson carburettor, E.S.C. crankshaft, B.T.H. magnetos, Wellworthy piston rings, K.L.G. plugs, Petroflex tubing, Shell fuel, Castrol oil, Fairey metal airscrew, Smith's instruments, Sperry artificial horizon, Reid and Sigrist turn-and-bank indicator, Dunlop tyres, Demec navigation lights, Triplex safety glass.

Mr. Brook's Contribution

Three records were the bag that Mr. H. L. Brook hoped to bring back to his wife and to Harrogate when he set out from Gravesend Airport at 6 a.m. on Sunday, April 25.

At first favourable reports of his progress came in. "Cape Flier Passes Rome." "Brook Reaches Cairo." Then came "Anxiety for Cape Flier. This was due to his being forced down by bad weather at Bor, Sudan. Finally "England-Cape Record Abandoned." Bad luck in the form of a broken tail wheel when taking off from Juba for Kisumu had preserved a little longer for Mrs. Mollison her outward record.

Immediately on arrival at Capetown Mr. Brook, disappointed but still determined, started to prepare for a new take-off, for the return and both-way Cape records were still to be captured. On Sunday, May 2, at 3.02 p.m. B.S.T., the Percival Gull was off again with nose pointing homewards. A stop at Johannesburg and a 7.55 p.m. arrival at Broken Hill, Rhodesia, were reported. From there news of progress was received at short intervals from Kisumu and Cairo, and on the Tuesday morning Mr. Brook took off from Wadi Halfa for Brindisi. He arrived there uneventfully and took off again at 3.25 p.m., with time in hand, but altered his plans and landed very tired at Rome, where, due to heavy rainfall, a flap was damaged. The aerodrome people undertook to replace the damaged part in time for an early start, and at 5.45 a.m. on Wednesday, May 5, Mr. Brook took off and completed his flight without further happening of note, finally landing at Heston at 3.20 p.m. and giving his Gull into the custody of Airwork, Ltd.

The homeward journey had thus been made in 4 days 20 mins., while the overall time for the 13,000-mile double journey was 9 days, 9 hrs. 30 mins.

The Percival Gull G-ADZO with Gipsy Six Series I engine was originally flown by Amy Mollison and was new for her Cape flight. As is usual with record machines, a large additional tank (in this case of 85-gallon capacity) is fitted inside the cabin, reducing accommodation to a single seat, and a 9½ and a 20-gallon tank are located in each wing-root. An extra 3-gallon oil tank is placed beside the pilot. These extra tanks, a collapsible canoe and paddle, an Irvin parachute pack, numerous maps, bottles of lemonade and a Thermos flask reduced cabin space to a minimum.

Components and equipment which played their part were:—

Claudel Hobson carburettor, Lodge plugs, Amal petrol filter, Tecalemit oil filter, Rotax generator, Eclipse starter, Petroflex tubing, Shell fuel, Castrol oil, Dunlop tyres, extra tankage by E. G. Brown, Smith's instruments, Sperry turn-and-bank indicator, Sestrel compass, Rotax electrical equipment, Demec navigation lights, Rotax landing lights with Philips bulbs, Thermotank cabin heaters, Aerolux collapsible boat, Irvin parachute.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

THE "Avia" International Aero Exhibition is to be held at The Hague from July 30 to August 15.

A Soviet pilot claims to have taken a twin-engined transport to 29,865 ft. with a load of one ton.

A thousand-mile air race has been arranged for Durban's air pageant on July 23 to mark the opening of the new airport.

Mr. J. A. Mollison flew to Kastrup Aerodrome, near Copenhagen, in his Bellanca monoplane last week on a business trip.

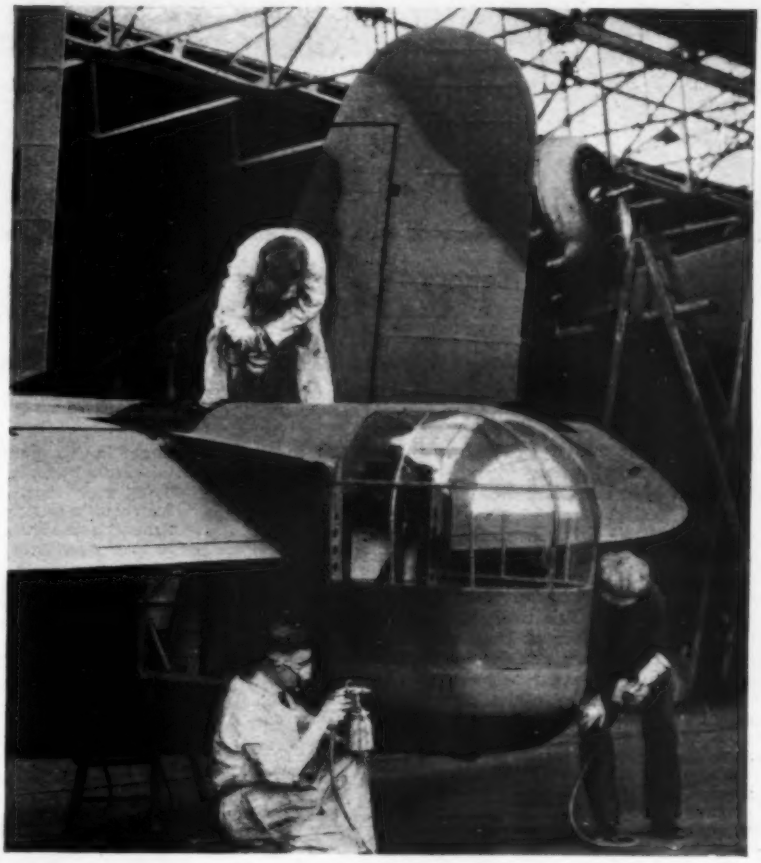
What is hoped will be the biggest civil air display ever seen in this country will take place at Hanworth on Empire Air Day, May 29. More than thirty types of aircraft will take part.

Nine German and seven French firms, and a number of Belgian, Italian, Polish, Czech and Dutch concerns are stated to have taken space at the Brussels Aero Show, to be held from May 26 to June 6.

An export company will show three American aircraft, the Beechcraft, Cessna and Porterfield, and also the Le Blond engine. So far, according to the organisers, there is only one British exhibitor—De Havilland's.

The Coronation contingent of the Royal Australian Air Force recently visited the Supermarine works, which were of especial interest to them as the birthplace of the Walrus amphibian, or, as the R.A.A.F. term it, the Seagull.

The new aircraft factory on Clydeside, which William Denny and Brothers are to operate in conjunction with the Blackburn Company, is expected to be ready to begin full production of flying boats by the end of May.



CHIAROSCURISTS WITH COLOUR: "Shadow shading" a Handley Page Harrow heavy bomber prior to delivery to an R.A.F. squadron. An article on the revival of camouflage appeared in *Flight* of April 29.

PAUSE FOR REPAIRS: A reader's snapshot of Mrs. Bonney at Alor Star, Malaya, during her recent Brisbane-Cape flight. She was awaiting the repair of a burst tyre on her elderly Klemm monoplane.

Group Captain G. H. Tait, who acts in an advisory capacity to the Egyptian War Ministry, is to visit British aircraft factories with a view to purchasing machines to equip two squadrons of the Egyptian Army Air Force.

Monsieur Raymond Delmotte was forced to abandon his Caudron by parachute during his recent attempt on the world's landplane speed record. It is understood that a stone became wedged in the gap between the tailplane and the elevator.

On May 6 a Macchi M.C. 94 commercial amphibian with two 750 h.p. Wright Cyclones averaged 158 m.p.h. over 1,000 kilometres, and 154 m.p.h. over 2,000 kilometres. Six of these machines have been in service for twelve months with Ala Littoria.

The Hawker Hart fitted experimentally with Bristol Mercury VIII engine and gilled cowling, which was to have appeared at the Royal Aeronautical Society's garden party on Sunday, does 209 m.p.h. at 15,550 ft. and climbs to 17,000 ft. in 7 min. 17 sec. This machine has been used for comparative tests with the present installation and a Mercury VI with Townend ring.

Twenty-five Years Ago

(From "Flight" of May 11, 1912.)

At Marblehead, Mass., on the 13th ult., F. Rodman Law by the aid of a parachute dropped a distance of 1,200 ft. from a Burgess hydro-aeroplane piloted by P. W. Page. The parachutist fell in the waters of the harbour, and he was rescued by a motor boat. About 35,000 people gathered to watch the performance.

PRACTICAL IDEAL

An Interesting Cabin Monoplane from Lancashire : Good Speed Range and Field of View

SOME time ago it was learnt that a firm in Chorley (Lancashire) was going ahead with the construction of a light aeroplane from which an exceptional range of performance was expected. Very sensibly, the manufacturers—Moss Brothers Aircraft, Ltd.—did not wish to say anything about their production until the machine had actually flown and given its sponsors some idea of what it would do. Now that the Moss monoplane has been tested and is ready for Martlesham it is possible to give a few details of the machine, and although performance figures are not yet available, we learn that the cruising speed is rather better than 120 m.p.h.

The original idea of the company was to produce a cabin machine at a reasonable price which would cruise at something well over 100 m.p.h., yet land very slowly and provide as good a view for the pilot as is possible in a tractor machine. Initial trials have shown that the ideals have been largely achieved.

In conformity with modern ideas, the machine is a low-wing, ply-covered monoplane with a single-spar wing and trailing edge flaps. The two occupants are seated in tandem with ample luggage space behind them. It is powered with a Pobjoy Niagara III of 95 h.p., and, carrying a useful load of 400 lb., the range should be 400-500 miles. A cantilever oleo-pneumatic undercarriage is fitted with the usual low-pressure wheels and brakes. The provisional price is £750.

The company concerned in this venture is an interesting one, since the five directors are all brothers and each one of them has had practical flying experience; two, in fact, have their "B" licences and Instructor's Certificate, and one, the eldest, holds Argentine, American and British licences with nine years' flying experience in these countries. Consequently, there should be little doubt that the machine will be practical in both design and performance. Their family business is, in fact, that of varnish manufacture, carried on by H. S. Moss and Co.

The available dimensions and other figures for the Moss monoplane are as follows:

Span 34ft., length 23ft., height 7ft., weight empty 860 lb., weight loaded 1,260 lb., fuel capacity 21 gallons, oil capacity 1¾ gallons.

Though quite conventional in appearance, the Moss monoplane certainly has very clean lines, and the tandem seating arrangement has a great deal to recommend it.

Topics of the Day

More Gadgetry

DURING the past few months I have flown or been flown in so many machines with a full complement of devices that I have lost most of my initial fear that such complications might add to the danger of flying; in fact, I feel almost lost when I enter a machine with the barest essentials. I suggest that gadgetry, as such, merely demands additional concentration during the first hour or so, and that one's attentions thereto should eventually be as instinctive as they are during the process, for instance, of working through the gears up to cruising speed in a car.

A year ago the thought of being in charge of a machine with flaps, a v.p. airscrew and a manifold pressure gauge would have meant sleepless nights. One lives and learns. Provided that the machine itself is good and viceless there is no reason to view such complications with any misgivings. There will always be the completely simple machine for the absolute novice, and the more expert pilot will always demand the better performance which inevitably means the steady addition of one gadget after another.

In the course of a few hours last week I flew one aeroplane with four instruments and four controls, and another with twenty-four instruments and twenty-four controls of one sort or another. After an initial period of rubber-necking and being decidedly hot round the collar I was just as at home in the second as I was in the first; I am always nervous, in any case, of a new type, whether simple or otherwise.

Passenger Nerves

WE all know the car passenger who is also a driver and makes life a misery by reminding one of this or that, and by pressing the floorboards so very hard that one can hear the body creaking. I have every sympathy with him, and sometimes suffer the same kind of feeling when I am a helpless passenger in an airline machine which is being flown blind for a very long period.

Yet it is only necessary to be in a position of knowing what is going on up in front to be perfectly happy in the very worst circumstances. Hence the fact that otherwise normal air-line pilots are not disturbed too much by a succession of accidents to other machines. The matter is in their hands and they are much too busy to give more than a quickly passing thought to any possible dangers.

During the aforementioned few hours I also spent a matter of three in the control cabin of a transport aeroplane which was on the job. In that three hours I saw the ground for perhaps ten minutes or a quarter of an hour in all—and the sky not at all. As a passenger I should have been bothered by needless anxiety; as a watching and working member of the crew I was completely happy even when the machine was being brought in on a succession of bearings through a cloud base which was perilously low.

The reason is obvious. Not only could I see all the instruments, but I also read the radio messages as they were transmitted and received, and knew almost exactly where we were during the entire flight. Carried out with expert precision, the whole business appeared simple and safe, and the only possible danger was that the radio equipment might elect to fade out altogether at some critical moment.

Unfortunately, I am told on good authority that some of our transport pilots are not so expert, and that a few of them have a blind hatred of cloud-flying, and an irresistible urge to go "down and look" at the most inopportune moments. The powers that be should surely look into that accusation. Such tactics simply will not do. Either we wash out all attempts to fly in bad weather or we do it thoroughly and with absolute confidence in the methods used. Half-hearted blind-flying is the most dangerous thing in the world, and has been at least part of the cause of quite a few accidents which have occurred during the last few years.

Business Support

FROM time to time since the start of the movement various flying clubs have been formed by and for the personnel of certain firms, but never before have the business chiefs themselves taken such a useful interest as they are doing in the case of the newly formed Midland Bank Flying Club. I mention it only because the idea of real encouragement, by the people who can afford to give it, might well spread throughout the country.

In this case the directors have always taken a very real interest in the sports activities of the bank employees, and the flying club is just one more branch which must show its value in due course if the support is to be indefinitely provided. Some idea of the extent of this support may be gauged from the fact that members' flying up to the "A" licence stage is covered by the annual subscription alone, and that thereafter the members can fly for 10s. an hour! Obviously, few of the ordinarily salaried employees of any firm can afford to do much flying at normal club or school rates, but the members of this club should each be able to afford an hour's flying every week without unduly straining their finances. Other business houses please copy.

INDICATOR.

Private Flying

FROM the CLUBS and SCHOOLS

CINQUE PORTS

THE Club's Leopard Moth (G-ACPG) was hired for Coronation Day to fly pictures and so forth from Hendon to Manchester and Cardiff. Mr. R. D. Gerrans has joined the Club, while flying hours for the week ended May 2 totalled about sixty.

OLD ETONIAN

The Marquess and Marchioness of Londonderry recently gave a cocktail party to members of the Old Etonian Flying Club at Londonderry House. This was very well attended.

YORK AND LEEMING

Flying times for April aggregated 168 hr. 50 min. Mr. R. Barwick has gone solo, Mr. M. H. Pinches has passed his "A" licence tests, and new members include Miss Elizabeth Scott and Mr. White. Several club members are hoping to fly to Le Touquet for Whitsun.

Club machines flew 57 hr. 20 min. last week, and Mr. Gresses, of Barton Airport, has joined the Club to take an instructor's course.

MALLING

Flying times for April amounted to 92 hr. 30 min. Club machines visited Shoreham, Southampton, Wilmington, Skegness, Ramsgate, Hatfield and Southend. Messrs. Higgins and Middleton have passed their "A" licence tests, and there are several new flying members.

PLYMOUTH

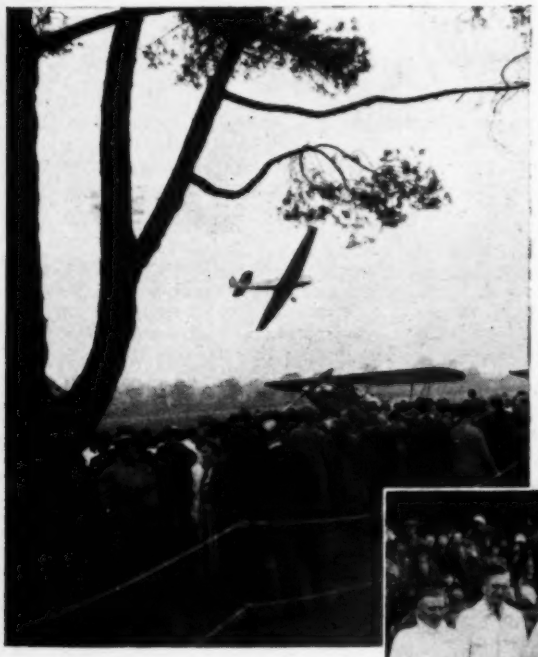
With the return of fine weather members have been able to do rather more flying than of late. Mr. Fox has passed his "A" licence tests and Mr. Tapley, who is taking a "B" licence, has gone solo. New members are Messrs. W. L. G. Bennett, B. G. Burnett, I. Mann, R. W. Stansell and L. J. Whitlock.

HERTS AND ESSEX

Weather during the fortnight ended April 30 improved somewhat and flying times were 131 hr. 32 min., making a total for April of 263 hr. 3 min. Mr. J. B. Bayas has completed the tests for the "A" licence, and new members are Messrs. F. E. Bardell, J. H. P. Brymer, J. C. Rise, E. G. B. Kiddle, L. Manilan and J. F. Beaumont.

REDHILL

Hours for the week ended April 30 amounted to seventy-one. Mr. Junkison went solo, and new members were Messrs. R. E. Wild, K. C. Robinson, L. C. Withall and K. Downey. For last week the hours amounted to sixty-one. Both the Club Puss Moths, with Messrs. Mulder, Glabbeek, Malcolmson and Houdret, left for the Austrian Aero Club's Whitsun party. Mr. Hebeler passed his "A" licence tests.



BUSINESS BACKING: At the official opening party of the Midland Bank Flying Club. Above is a nice piece of line-abreast flying, in Blackburn B.2s, by the bank pupils of the R.A.F. V.R. at Hanworth, and a general view of the proceedings—with one of the Club's two B.A. Swallows in the air, and, on the ground, one of the three Demons of No. 600 (F) Sqd. A.A.F. which put up a display during the afternoon. Below the Rt. Hon. Reginald McKenna, Chairman of the bank is being introduced to the members, of the Club, who were specially attired for the occasion.

(*Flight* photographs)

MIDLAND

Flying times for the week ended April 30 totalled 45 hr. 45 min. New members are Miss W. Bach (flying), Dr. Benson and Messrs. H. W. Hemming, W. H. Craven, F. J. B. Hopkins, T. W. Clibbery and C. R B. Smith (ordinary).

BRISTOL AND WESSEX

Club members flew 39 hr. 20 min. during the fortnight ended April 24, and one solo flight was made by Mr. J. Keedwell. Messrs. R. A. Elton and N. C. Aubrey-Fletcher have joined the Club. The passenger fee of 5s. per day has now been reduced to 1s. per flight.

SOUTH COAST

Forty-three hours' flying was logged during the week ended May 2. New members were Messrs. J. P. Hannay, F. A. Smith, E. Rhodes and N. Buchanan, while Dr. C. H. Selby passed his "A" licence tests. For last week times totalled 39 hours. Arrangements are now complete for the dawn patrol on May 23, which it is hoped will beat last year's record of sixty-eight machines. This will be preceded by an "Eve of the Battle Dance."

HANWORTH

The flying time at Hanworth for the week ended May 1 was 77 hr. 30 min. New members were Mr. A. Gazda, Mr. J. Ward and Mr. P. Smith. Mr. L. E. Knight went solo and Mr. P. Powell passed his "A" licence tests. Time for last week amounted to 84 hr. 50 min. New members were Mrs. Betty Kirby-Greene and Messrs. J. Roberts, Brice and Kiley. Mr. T. Welsh and Mr. R. Hafner have passed their "A" licence tests, and Mr. D. Tressler has gone solo.

YORKSHIRE

Club machines flew 69 hr. 10 min. during the week ended May 2, and 140 hr. 5 min. during the month of April. Mr. F. Leach passed his "A" licence tests and Mr. J. A. Smith, an aviation group member, went solo.

Last week's flying totalled 41 hr. 25 min. New members are Messrs. W. Garthwaite and Dewsbury (flying), and Mrs. Rinch-Womersley and Messrs. A. Ambler, Bradford, E. T. Laverack and Shipley (associate).

DONCASTER

Club machines put in 22 hr. 20 min. for the week ended April 28, bringing the total flying time for April to 42 hr. 35 min. New members were Mrs. E. Kitchen, Miss E. Wilson, and Messrs. T. S. Jenkinson, A. Parkin, R. C. Davies, W. Pyrah, H. J. L. Cawood, W. H. Yoell, G. A. Bell and F. E. L. Banister. A total of 20 hr. 40 min. was put in during last week. Mr. W. Humble's Leopard Moth (G-ACLO) is now being kept at Doncaster. The Club's next dawn patrol has been fixed for May 30.

YAPTON

Flying times for the month of April reached a total of 139 hr. 20 min., the weather being very fine indeed during the latter part of the month. The times for last week were 34 hr. 35 min. New flying members are Capt. and Mrs. Dane, Mrs. Marie Hajek, and Messrs. J. Hutton, E. F. Sall, C. W. Parish and L. K. Cozens. Capt. and Mrs. Dane have joined the Club for flying while on leave from Malaya, and the last four are taking the £15 "A" course. Mr. J. G. Pierce has made his first solo, and Miss Beryl Partridge and Mr. Arthur Gadie have passed their "A" tests.

CAMBRIDGE

Flying times at Marshalls' Flying School for the week ended May 2 totalled 90 hr. 35 min. Messrs. Pringle, Butterworth, Gordon, Giles, Gibbon and How joined the School, and Messrs. Drew and Gabb went solo, Mr. Drew also passing the tests for his "A." For last week the flying times totalled 94 hr. 35 min. Messrs. Challis, Turner, Griffin and Allen joined, and Messrs. Rigg, Pringle and Smith went solo. Mr. Wallis passed the height and cross-country test for his "B" licence, and Mr. Mitchell the technical examinations for his "B."

BROOKLANDS

Club machines flew 126 hours during the week ended May 2. "A" and "B" licence tests were passed by Mr. Auster and Mr. Stevens respectively, while Mr. Willoughby went solo. The Brooklands Aero and Flying Club, co-operating with the Coronation Hospitality Committee, recently entertained a large party of overseas visitors at the aerodrome. During last week the time was 89 hours, and Messrs. Spreckley and Furnival went solo. "B" licence tests were passed by Messrs. Ewart and Stevens, and the instructor's course is being taken by Mr. Chalmers. The new hangars of Brooklands Aviation are now complete internally and the service department has already moved into its new home. A fifth Tiger Moth will shortly be added to the Club fleet and this will be completely equipped for blind flying.

LONDON

The flying time for the week ended May 1 totalled 141 hr. 30 min. Messrs. A. Carnegie and A. G. Wainwright made their first solo flights, and new members were Miss R. Robertson, Mr. G. Hinckley and Mr. J. Scott. Last week the total was 178 hr. 45 min., and Messrs. G. S. Pine and J. H. Wingate-Hill flew night flights from Croydon to Lympne. New members were Miss R. King Everard and Messrs. J. B. Douglas and J. S. Fox.

The Club will be open during the Whitsun holiday, but, as usual, will be closed on Saturday, June 26, the day of the Royal Air Force Display. The S.B.A.C. Display will take place on June 28 and 29, and the Club will be closed on these days—as it will on September 10 and 11 for the King's Cup Air Race. Members will have the same facilities as those of the Royal Aero Club.

LEICESTERSHIRE

Machines of the Leicestershire Aero Club put in 77 hr. 40 min. during April. Twenty-four trips to ten different aerodromes were made, and forty-nine machines of various types visited the aerodrome. The Club has acquired a new D.H. Tiger Moth (G-AETO).

C.A.S.C.

For the week ended May 2 members flew 18 hr. 15 min. at Cambridge, and last Sunday week No. 4 (Kent) Squadron put in 4 hr. 30 min. at Gravesend. Mr. A. G. Drew has carried out his "A" licence tests and Messrs. Bird, Gibbons and Allan have made trial flights. On Saturday last members were on duty at Hanworth for Midland Bank Flying Club's opening. At Cambridge on Sunday, in spite of incessant rain, members flew 3 hr. 25 min.

EAST MIDLANDS

During recent months the East Midlands Flying Club has made tremendous strides in achieving the ambition of "Flying for All." No fewer than twelve members are at present taking a special "A" licence course inaugurated and financially supported by Mr. Le Champion, the president. The Club now has a Comper Swift, an Avro Cadet, a Gipsy I Moth and a B.A.C. Drone, and the clubhouse and aerodrome is open every day, with the exception of Monday.

SOUTHEND

Owing to the fact that Southend is being visited by the Fleet for the Coronation celebrations, special arrangements have been made to enable members and visitors and the general public to view this sight from the air and for this purpose the Club's twin-engined Scion will be used and be augmented by other aircraft as required. All officers of the Fleet stationed at Southend have been invited to the Club as honorary members and a special programme has been arranged.

NORFOLK AND NORWICH

Nearly 35 hours were put in by the Norfolk and Norwich Aero Club pilots during last week. Messrs. Bradley, Watson and Hesketh have now completed their "B" licence training at the Club. The first is proceeding to Hatfield in order to obtain experience on bigger types, whilst Mr. Hesketh is leaving for the Blackburn School at Brough for the same purpose. Mr. Norman Brett is taking the instructor's course with Flt./Lt. Bullmore. Mr. O'Meara has made his first solo.

NORTHAMPTONSHIRE

Flying hours for the month of April at Sywell were very satisfactory, the total being more than double that of the same month last year. The Club's private owners continue to be very active. Many cross-country flights and trips to the Continent were made by Messrs. J. and G. Linnell and Mr. Henry Deterding. On Thursday, May 6, the brothers Linnell had the interesting experience of forming the opposing air forces at the field day held by the Wellingborough O.T.. The scouting and bombing carried out by them was of great value in making the manœuvres a success.

A.S.T.

A further type of training has now started at Air Service Training, where instruction is being given to members of the R.A.F. Volunteer Reserve. As this entails evening and week-end work, A.S.T. now works 364 days in a year. A further indication of the rapid expansion of the School is that a third Cutty Sark amphibian has been taken on during the month to cope with the training of Long Course students, while a "baker's dozen" of three new types are on order.

Hamble will then possess forty-eight machines of fourteen types. A Kestrel engine and a Fury airframe, the gifts of Rolls-Royce and the Hawker Aircraft Co., have been added to the instructional equipment. The larger hangar is being doubled in size and work has started on the erection of a large modern mess. When the latter is complete the existing Club building will be converted into a lecture centre.

A distinguished visitor during the month of April was Mr. Carroll Cone, of the U.S.A. Bureau of Air Commerce, who paid a visit to the School, accompanied by Major O. G. Villiers of the Air Ministry. New civilian pupils are Messrs. Phitidis, Makhyoun, Duff-Mitchell, Turnbull, Kimpton and Hallett. Four of these are taking Long Courses. Messrs. Olley and Fenwich have left to join the staff of Imperial Airways and Messrs. Raubenheimer, Stephens and Ando have completed their training.

A Flapped Sailplane

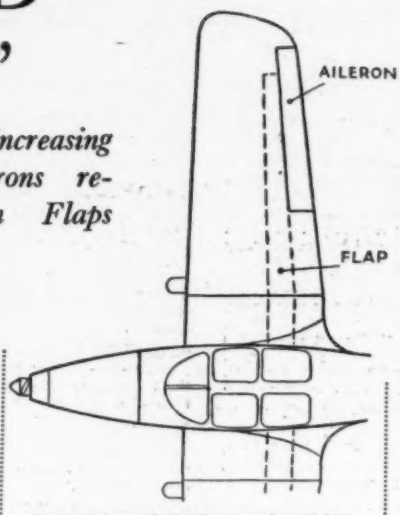
THE first of the three special sailplanes, which are being produced for July meeting on the Wasserkuppe, has now flown at Sutton Bank. The machine has been made by Slingsby Sailplanes, of Kirby Moorside, to the designs of Sqd. Ldr. G. M. Buxton, and is especially interesting because split trailing edge flaps have been fitted. This sailplane is a direct descendant of the Hjordis I, and will be known as the King Kite. It has a fixed tailplane and the controls are generally less sensitive than those of its forerunner.

In addition to Sqd. Ldr. Buxton, nine pilots have been invited by the British Gliding Association to attend the Wasserkuppe meeting, including such well-known soaring experts as Messrs. Wills, Hiscox and Dewsbury, and Mrs. Price, who is better known under her maiden name of Meakin.

"CHORD FLAPS"

Marendaz System of Increasing Lift and Drag : Ailerons retained with Full-span Flaps

IN spite of the numerous arrangements of trailing-edge flaps which have been tried, there is no guarantee that the most effective type has yet been discovered. Such well-known versions as the Zap, Hall, Fowler and Junkers all give fairly good results, some being more effective than others, but all having their advantages and disadvantages. And now Mr. Marendaz, of International Aircraft at Maidenhead, raises a new set of problems by introducing a type of flap which appears to combine in it something of several of the previously known types. The so-called split flap is usually so located on the wing that its trailing edge coincides, more or less, with the trailing edge of the main wing. What Mr. Marendaz proposes to do is to locate his flap some distance ahead of the trailing edge; in fact, far enough ahead of the edge to enable him to retain his ordinary ailerons behind the flap, thus making full-span flaps possible should they prove desirable. To distinguish this type from the trailing edge flap one might call it a "chord flap."



A plan view of the International Aircraft monoplane, showing location of the Marendaz flap and aileron.

The arrangement is shown in the sketch and diagram. The flap is hinged to the rear spar, the hinge line being some distance ahead of the leading edge of the flap. In the closed position the flap rests in a recess in the underside of of the wing. As the flap opens a slot forms, owing to the forward location of the hinge line, the slot width increasing with flap angle.

In view of the unusual arrangement of the Marendaz flap it is difficult to foresee how it will compare with more orthodox types. Some experiments carried out in 1935 in the American N.A.C.A. full-scale wind tunnel on special wings fitted to a Fairchild 22 provide a clue to the effects of moving a split flap forward from the trailing edge, but the flaps and flap locations tested did not include the slot which, in the Marendaz flap arrangement, is left between the flap and the wing when the former is depressed.

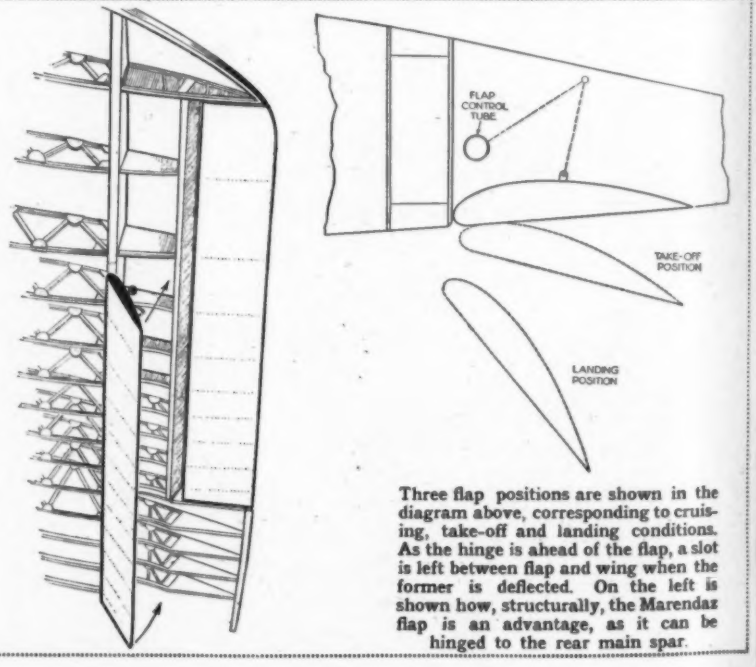
Of the American test results two combinations only come into consideration. Flaps of 0.1 and 0.2 of the wing chord were tested at different flap angles and at two hinge locations: 68 and 80 per cent. of the wing chord from the leading edge. The results may, generally speaking, be said to have indicated that the increase in lift and drag obtained by the use of the flaps diminishes with decrease in flap chord and also with the forward position of the flap hinge.

The fact that the Marendaz flap has a slot in front of it at large flap angles will obviously affect the airflow to a considerable extent, and there is little use in speculating about the result. Tests are to be carried out on the cabin monoplane now being built at Maidenhead, a set of wings having been made with the new flaps in order to try out the system in actual flight.

From a structural point of view there is a good deal to be said for hingeing the flaps as far forward on the chord as possible, since not only will the pitching moment caused by the deflected flaps probably be reduced, but the flap supports can be located on the rear spar instead of on a false spar; this should save a considerable amount of weight.

The manner in which this type of flap will affect the ailerons can only be discovered by actual flight trials. Mr. Marendaz believes that the slot will allow air to flow at high velocity to the underside of the ailerons, but it may well be that this will have the effect of reducing the effectiveness of the flaps as flaps. At least the system is interesting, and the flight trials should provide some very instructive information. According to the inventor, the flaps will give a considerable increase in lift at small flap angles and a great increase in drag at large ones.

Should the Marendaz flap be found to have the aerodynamic action which the inventor expects, two positions will obviously be used for take-off and landing, i.e., the slightly open and the fully open respectively. Presumably the slightly open would also be used during the approach.



Three flap positions are shown in the diagram above, corresponding to cruising, take-off and landing conditions. As the hinge is ahead of the flap, a slot is left between flap and wing when the former is deflected. On the left is shown how, structurally, the Marendaz flap is an advantage, as it can be hinged to the rear main spar.

This view of a Junkers Ju.86 shows the clean installation of its Jumo 205 Diesels.

The DIESEL PROBLEM

A Brief Review of the C.I. Situation as it Affects Aircraft

By CAPT. ANDREW SWAN, B.Sc., A.M.Inst.C.E., A.F.R.Ae.S.

FEW authorities are better fitted to discuss the Diesel question than is Captain Swan. As head of the Engine Department of the Royal Aircraft Establishment, Farnborough, he has been able to study and assist the development work on C.I. engines in this country. In the accompanying article he views the situation concisely and in its true perspective, setting out the qualities and shortcomings of what has been called the Cinderella of aero engines against those of the petrol unit.

INTEREST in the compression-ignition engine for aircraft has waxed and waned several times during the past eighteen years. So far as this country is concerned, a certain amount of experimental work has been done throughout, but while this type of engine has its adherents, the general view of its future in aviation is one of some uncertainty. On the other hand, intensive preoccupation with the petrol engine may account for some lack of interest. No doubt there are important technical difficulties to be overcome and penalties attached to its use, as otherwise few could dispute the desirability of an aircraft engine which is more economical in fuel than the petrol engine, uses an inherently cheaper fuel of plentiful supply, has a reduced fire risk, and operates without the complication of electrical ignition.

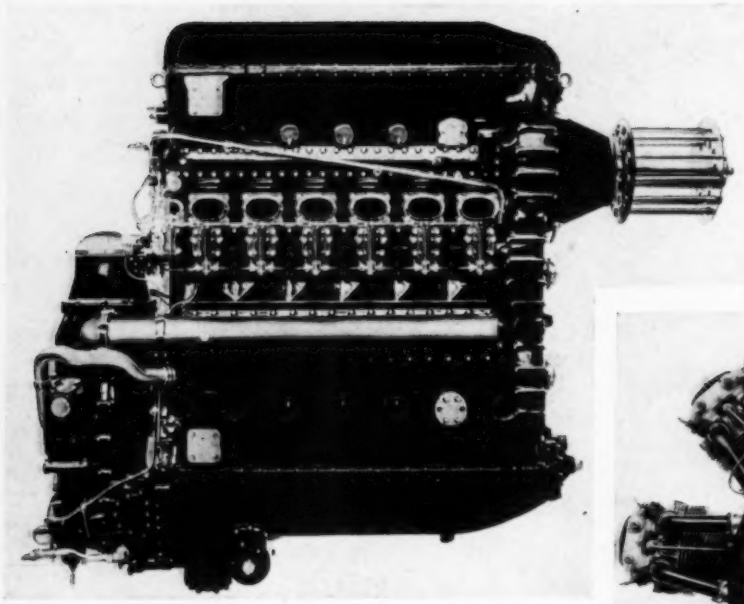
In the notes that follow, endeavour will be made to outline the progress and problem of the compression-ignition engine and at the same time to indicate the contemporary development of the petrol engine, so that the promise of the former may be measured in terms of the achievement and the further promise of the latter.

The Four-stroke Compression-ignition Engine.—In 1927 H. B. Taylor published the results of his work at the Royal Aircraft Establishment on a single-cylinder compression-ignition engine. This had a bore of 8in., a stroke of 11in., and ran at speeds up to 1,200 r.p.m., so that the piston speed was comparable with that of current petrol engine practice. The fuel consumption under moderate load conditions was as low as 0.37 lb. per b.h.p./hr., and was exceedingly attractive in comparison with the consumption of petrol engines at that time. There appeared to be a saving of fuel of at least 25 per cent.

The brake mean effective pressure was much less than that in current petrol engines, and the power output was, therefore, relatively low. In consequence, a larger engine would have been required for a given total power output. In addition, the high pressures at the commencement of the expansion stroke necessitated a strengthened design. These two factors the low power output and the high maximum pressure, make the chief contribution to the heavier weight of this type of engine. Nevertheless, it is clear that for a given flight endurance the total weight of engine and fuel is the important factor, and not the weight of the engine alone, and there must be some range above which it should be advantageous to use a compression-ignition engine instead of a petrol unit.

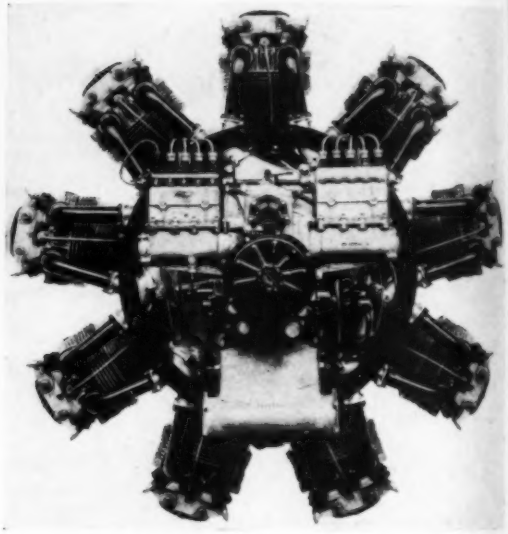
The cylinder used for this experimental work was a large

More commercial Junkers with their economical heavy-oil Jumos.



(Left)
The Napier Culverin (built under Junkers licence) gives 720 h.p. at 1,700 r.p.m.

(Below)
Of 1,753 cu. in. capacity, the Bristol Phœnix gave 470 h.p. at 1,900 r.p.m.



one, and it was thought there might be some difficulty in obtaining a similar performance from smaller sizes, but Ricardo and others showed that it was possible to do so. Since then experiments have been made with cylinders of various sizes, air-cooled and liquid-cooled, poppet-valve and sleeve-valve types, while different kinds of injection systems and various forms of combustion chambers have also been tried. The results obtained have been more or less of the same order as those given by the large cylinder, with perhaps a small improvement in the best of the types.

An Explanation

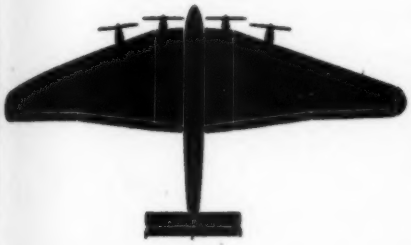
In this type of engine burning commences practically simultaneously with the injection of the fuel, and it is hardly to be expected that complete mixing of the fuel and air will be obtained in the short time available. In consequence an excess of air to burn up all the fuel is necessary for economical combustion. This inadequate mixing of the fuel and air is the fundamental difficulty in the way of producing an output comparable with that of the petrol engine. In the carburetted petrol engine the fuel and air are mixed at quite an early stage in the process and are drawn together into the cylinder and compressed before ignition. Even in the direct petrol-injection engine, where the petrol is sprayed into the cylinder or induction system, the spraying takes place as early as possible in the suction stroke, so that there is a considerable interval of time for the fuel and air to mix. If the spraying of the fuel is delayed the power output is reduced considerably. In this respect the results are similar to the compression-ignition engine.

With a view to improving the performance, resort has been made to supercharging the air in the cylinder, but the first experiments were not very successful, and only about half the benefit to be expected was obtained. Later work has given better results, and for supercharged engines there is no reason why a power output should not be secured equal to that of the petrol engine. A larger supercharger would be required than in the petrol engine, and the high maximum pressures would have to be dealt with by suitable design; in other words, a heavier engine would result.

A few experimental four-stroke engines have been made, and brief particulars, including the weight per horse-power, of some of these are given in the accompanying table. Regarding the Bristol Phœnix engine, experiments have been continued on a single cylinder to a stage where a con-

Name.	Type.	H.P. Normal.	Normal b.m.e.p. lb./sq. in.	Piston Speed ft./min.	Consumption lb./b.h.p./hr.	Weight per h.p./lb.	Remarks.
Packard	9-cyl. radial 4-stroke ...	225	93	1,950	0.375	2.77	Weight includes starter and airscrew hub.
Clerget	9-cyl. radial 4-stroke ...	300	101	2,120	0.396	2.4	
Bristol Phœnix ...	9-cyl. radial 4-stroke ...	420	100	2,380	0.4	2.6	Small supercharge. Weight includes starter and all accessories.
Jumo IV	6-cyl. opposed-piston, 2-stroke.	730	99	2,340	0.36	2.26	Dry weight.
Jumo V	Do. do.	530	Approximately as above.			2.04	Do.
Z-O-D 240A ...	9-cyl. radial 2-stroke ...	260	82	1,330	0.385	2.43	
Current petrol engines on 87 octane fuel.		—	160	2,200	—	1.75	
		—	170	2,800	—	1.2	

Four German types in regular service fitted with Junkers Jumo compression-ignition engines.



Junkers G.38 (four Jumo 204s).

Junkers Ju.52 (three Jumo 205s).

Junkers Ju.86 (two Jumo 205s).

Dornier Do.18 (two Jumo 205s).

siderably higher brake mean effective pressure has been developed for a fuel consumption not greatly exceeding the figure given in the table.

The Two-stroke Compression-ignition Engine.—Consideration has been given to the possibilities of the two-stroke C.I. engine in the hope that by doubling the number of working strokes the power output would be increased. The two-stroke cycle lends itself to compression-ignition operation because the fuel is sprayed into the cylinder when all the ports or valves are closed and there is no wastage of fuel as in a carburetted petrol two-stroke engine. The mechanism of the two-stroke engine, however, has its problems, particularly in relation to the admission of the air charge, the scavenging of the exhaust gases, and the dissipation of heat. The ordinary poppet valve is not very suitable owing to the rapidity and frequency at which it has to be operated, and it would seem that the simplest method of overcoming the difficulty is to use ported cylinders. This arrangement is used in the opposed-piston engine, in which ports are covered and uncovered by the piston, and in the sleeve-valve unit, where ports are controlled by the sleeve and by the piston. A combination of poppet valve for exhaust and ported cylinder for inlet is, however, also used.

Two-stroke Speeds

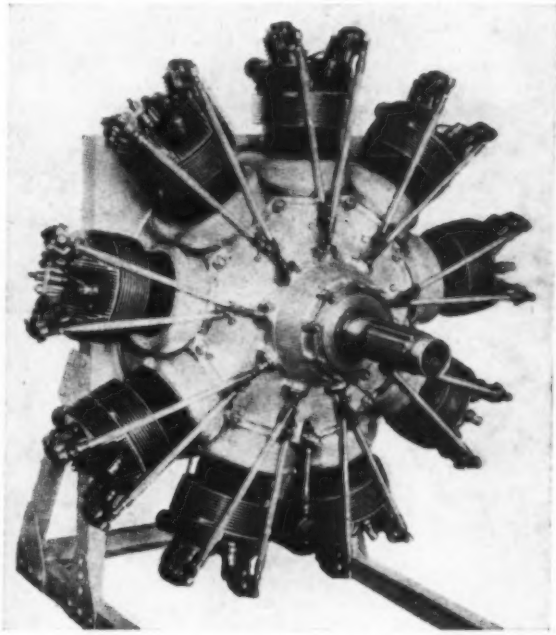
There is some doubt if the two-stroke engine can be run at the high speeds of the four-stroke petrol engine owing to the short time during which the ports are open for the new charge of air, and although this restriction can be minimised to some extent by raising the pressure of the air supplied by the scavenge compressor there will be some loss of net horse-power in doing so, because of the extra power required to drive the compressor. Alternatively, the stroke of the engine can be lengthened so that the port area may be increased, but the effective stroke is not increased correspondingly and the result will be a heavier engine.

Some form of compressor is necessary in the two-stroke engine to provide the fresh charge of air, and it is usual to deliver a large excess of air to ensure adequate scavenging of the exhaust products. Supercharging this type of engine with the normal type of engine-driven compressor presents certain difficulties because the inlet and exhaust ports are both open together for most of the time and there is a considerable loss of air through the exhaust ports if the supercharge pressure is high. A method by which this could be overcome is to use an exhaust-driven supercharger, in which system a back pressure proportional to the supercharge pressure is imposed on the exhaust and the loss of fresh charge is minimised. The problems of the exhaust turbo-compressor itself are lessened in the compression-ignition engine because of the much lower temperature of the exhaust gases and the consequent decrease in their destructive effect on the materials used.

Recent work on single-cylinder two-stroke units and the development of complete engines of the opposed-piston type and of the combined poppet and ported variety have shown that the systems are workable. Junkers Jumo engines of the six-cylinder opposed-piston water-cooled type are now in regular use on German airways and are the product of long and intensive development backed by the persistent faith of the late Professor Junkers in this type of engine. The low weight/power ratio is very creditable in view of the inherently heavy nature of the design, in which long cylinders, long pistons and two crankshafts are used. This firm is now developing an engine similar to, but of slightly smaller capacity than, the Jumo IV. The stroke is shorter and the scavenging improved, with a consequent reduction in supercharger size. The estimated weight/power ratio is 1.4 lb. per b.h.p. Junkers are also developing an exhaust turbo-compressor for these engines.

The Contemporary Petrol Engine.—Possibly as a result of the good consumption figures obtained in the early experiments on the compression-ignition engine there was renewed activity on the development of the petrol engine, particularly with reference to improving the fuel consumption and to the production of a mixture control to regulate the consumption under all conditions of flight.

At the time of the earlier work on the compression-ignition engine the octane value of the fuel used in petrol engines was about 75, but in recent years this has been



Modern practice in the construction of compression-ignition radials is exemplified in the Czechoslovakian Z-O-D-260 of 260 h.p.

raised to 87 and permits not only a higher power to be obtained, but also enables these powers to be developed at more economical consumptions. A flight consumption as low as 0.44 lb. per b.h.p. per hour is claimed in the U.S.A. with this fuel, but under general cruising conditions consumptions are much greater than this and are probably 0.5 and even higher.

It is quite likely that in the near future a fuel of 100-octane number may be in common use with a consequent large increase in output and a further decrease in specific fuel consumption. Thus the advantage of the low specific fuel consumption of the compression-ignition engine is gradually being whittled away, although even with 100-octane fuel the consumption of the petrol engine, unless specially designed for economy in fuel, is not anticipated to be so low as in the best compression-ignition engine practice.

Summary.—It would seem that compression-ignition engines will inevitably be heavier than petrol engines of corresponding form, but it is possible that a C.I. engine made in the lightest form, e.g., radial, would have no greater weight than the heavier types of current petrol engines.

In these days of increasing range of flight there may be scope for a compression-ignition engine for long-range work. For many military requirements the increased weight of the engine would be a serious handicap, but for certain civil purposes, even when the length of flight did not fully justify its use on economic grounds (so far as total weight of engine and fuel was concerned), it would seem worth while sacrificing a part of the useful—or pay—load for the advantages it offers of reduced fire risk and cheaper fuel.

Regarding the respective merits of the four- and two-stroke compression-ignition engines, it is doubtful if any appreciable reduction in weight will be gained in the two-stroke type in view of the particular and heavier design (long cylinder, long piston and larger supercharger) and the lower speed of this type. Against this it must be observed that the two-stroke Junkers engines are the lightest so far and are in successful operation.

The petrol engine for military purposes is developed as a compromise between high power output and reasonable fuel consumption. If it is desired to obtain a low fuel consumption much can be done (and on occasion has been done) in this respect at a sacrifice of power output. A special engine can be designed to operate at a specific fuel consumption closely approaching that of the compression-ignition engine, but, of course, it will be heavier per h.p.

The conflicting requirements of high power output and low fuel consumption might be met by a variable-compression engine using low-compression ratio and high boost for full power and high compression ratio and low boost for fuel economy. This arrangement could apply to both the petrol and compression-ignition types, but the latter would still be the heavier.

MORE R.A.F. BADGES

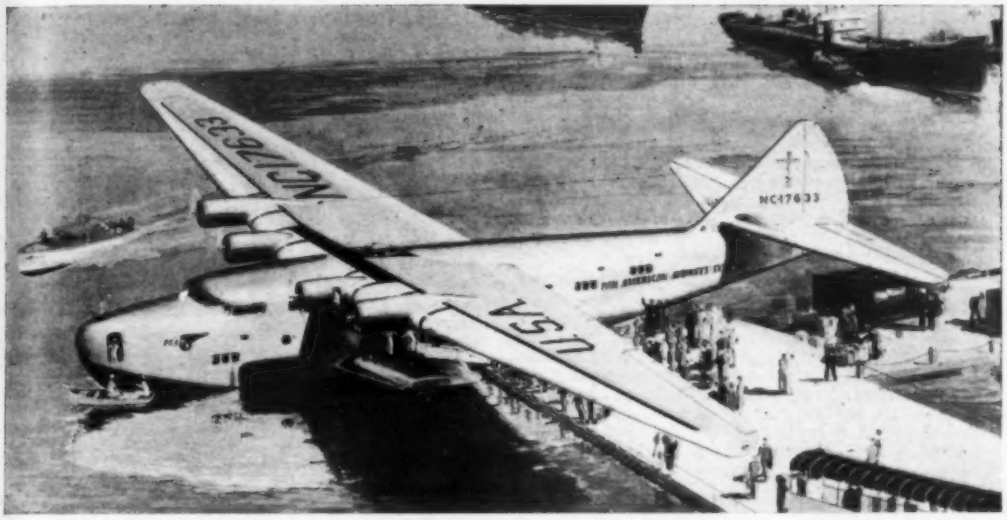
HIS MAJESTY THE KING has graciously approved badges for seven more R.A.F. and A.A.F. squadrons. One rather interesting feature of the present set is the badge of No. 26 (Army Co-operation) Squadron, with its Afrikaans motto, of which a translation is "A watcher in the sky." The squadron's South African associations date from the early days of the war, when a special squadron, largely consisting of South Africans who had come to England to learn to fly, was formed for service in South-West Africa. At the conclusion of the campaign the unit returned to England, and became No. 26 (South African) Squadron of the R.F.C. They saw further service, this time in East Africa, before being disbanded in July, 1918. The squadron was re-formed at Catterick in 1927 under its present designation.

The following are the descriptions of the seven new badges as drawn up by Chester Herald:

No. 9 (Bomber) Squadron: A bat. No. 16 (Army Co-operation) Squadron: Two keys in saltire the wards upwards and outwards. No. 26 (Army Co-operation) Squadron: A Springbok's head couped. No. 54 (Fighter) Squadron: A lion rampant semée de Lys. No. 64 (Fighter) Squadron: A Scarabee. No. 607 (County of Durham) (Fighter) Squadron: A winged lion salient, the hind legs also winged. No. 611 (West Lancashire) (Bomber) Squadron: In front of a Trident a Rose.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



ATLANTIC CLIPPER: Powered with four unnamed engines, undoubtedly the new 1,500 h.p. two-row Wright Cyclones, this Boeing flying boat, intended for Pan-American's transatlantic trials, should be flying this autumn. Seventy-two passengers will be accommodated over shorter distances.

THE WEEK AT CROYDON

R.Ae.S Garden Party Aftermath : Hanging Out the Washing : "B" Licence Procession : Atlantic Receptionists

IF these notes appear to be more than usually disconnected I must apologise to my seven readers and explain that at the time of scribbling my grey matter is distinctly kafuffled and my neck creaks if I venture to glance at the clock. The reason, excuse or blame for this lamentable state of affairs I lay at the door of the Royal Aeronautical Society, for what with Clouston's hopping Hafner, Staniland's "strip-tease" show in and out of a 150-metre ceiling, and the frightening frolics of the little fellows, I returned as I went—all of a dither.

Seeing the World

Despite the good fortune of an armchair ride in the security and luxury of the K.L.M. Douglas D.C.3, it has to be confessed that even under these ideal conditions hedge-hopping or gasholder-grazing in and out of cloud is not the pleasantest of pastimes, but the speed and quietude of the D.C.3, together with Mr. Plesman's inimitably entertaining personality as he flitted up and down the gangway, obviously dispelled any disquieting thoughts among the rest of the passengers—including, I am told, a young lady who, up for the first time, successfully mastered what she described as a "crisis" as we left Hanworth very much on our wing tip! Air-Commodore and Mrs. Robertson were on the passenger list, which also included "Miss Australia." Other Croydon representatives at Heathrow were Mr. Brian Allen on a spanking new Stinson Reliant, Mr. Tommy Wesson on the Spritely Tipsy, and Mr. Field-Richards on the Surrey Porterfield.

My remarks last week on the paucity of decorations were, perhaps, premature, for our venerable edifice, externally, for the moment, has assumed the aspect of a bleaching green at a laundry, since the Air Ministry has gone all gay with bunting and code flags. It is suggested that the latter will give "2nd N" candidates a much-needed facility for daily exercise, though one of the more knowledgeable assures me that the string of letters down the northern approach to one building is quite unpublishable—even in Esperanto. Appropriately enough, whether by forethought or accident one cannot ascertain, the "paying-off" pennant fluttered from over the tarmac entrance to H.M. Customs! There is a note, too, of tragedy in these decorations, for the sanctity of our beloved Control Tower has been broken, the radio mast having been degraded (?) to the rank of mere flag mast!

On the only fine night of the week extraordinary activity prevailed among "B" licence aspirants, and I am told that no fewer than eight of them successfully completed the Croydon to Lympne (or Lympne to Croydon, according to taste) night flight. At one time control had no little difficulty in deciding who was "coming" and who was "going."

Coronation is still a problematical question among the pleasure flying and charter companies; the question of success or otherwise is largely in the hands of the weather —and the busmen! We shall want the "194-from East-Croydon-which-drops-you-right-at-the-airport" very badly, we feel, otherwise the public will not come so far afield for their jollifications. On the other hand, many I have

Commercial Aviation

spoken to believe that there will be a tendency to give London a wide berth on the actual Coronation Night.

An unstamped P.C. with not even a picture on it tells me that I may return my pen to "A. Viator."

Well, I must along, 'cos a certain daily newspaper has taken over our airport to welcome Dick Merrill—a goodly lad—who is due in from America any minute. [He arrived on Monday as we went to press.—ED.] T. A. R. MAC.

Solent Restrictions

BETWEEN May 6 and 21 there are various restrictions on the movements of machines in an area enclosed by lines joining Calshot, Fareham, Hayling Island, Bembridge, Ryde, Cowes and Calshot in connection with the review of the Fleet and the preceding rehearsals. Full details are given in the *Notice to Airmen*, No. 73.

Flying Boats to Australia

IT has been announced by Mr. Thorby, the acting Minister of Defence in the Australian Government, that the through air-mail service by flying boat is expected to reach Australia next January. A certain amount of trouble has been experienced about the base arrangements at Sydney and elsewhere, and it is still possible that the terminal point will be at Brisbane, as is the case with the landplane service.

New Indian Mail Service

THE preliminary plans of Air Services of India include the operation of twice-daily services from Bombay to Bangalore, via Mahableshwar, Satara, Hubli, Belgaum and Bhadrawati; and from Bombay to Hyderabad (Deccan), via Mahableshwar, Satara and Solapur. It is understood that Mysore State has definitely promised a certain amount of financial assistance, either in the form of a grant or a subsidy, or by some other means, and, although Tata's are not regarded as financially concerned, they have maintained their interest in other ways. For the time being, at any rate, only mails will be carried by the company.

Air France's Next Objective

AIR FRANCE have decided to send Dewoitine 338s to South America for the re-equipment of their service between Natal, Pernambuco, Bahia, Rio de Janeiro, Montevideo, Buenos Aires, Mendoza and Santiago de Chile. This is a very significant move, as it means that the service—now principally for mails—is to be made into a through passenger line across the South American mainland to the Pacific.

Dewoitine 338s, carrying passengers as well as the South American mail, already operate from Toulouse to Dakar on this side of the South Atlantic, so that it only remains for the ocean section to be flown by passenger-carrying machines for a through passenger service from London to Santiago to be instituted. This objective is now well within sight, as the fleet of passenger-carrying Lioré et Olivier 47s—of which Air France has ordered six—will soon be flying between Dakar and Natal.

Airports in the North

AIR MINISTRY approval of a £30,000 extension scheme at Renfrew Airport is expected within a few days. At the same time the Scottish Flying Club will have completed negotiations with Renfrew Council for the renewal of the lease which expires next year. The area of the airport is to be increased from 96 to 170 acres, giving landing runs of 1,500 and 900 yards in two directions. Renfrew now has its special controlled zone over an area bounded by lines drawn between Balmore, Port Glasgow, Kilbirnie, Neilston, Rutherglen and Balmore.

Meanwhile, Allied Airways (Gandar Dower), Ltd. are likely to have a new Lerwick aerodrome in use during the late summer. The company applied to Shetland Presbytery for the necessary ground at Tingwall Glebe (some seven miles from Lerwick) for an aerodrome subject to it being licensed by the Air Ministry.

Two Classes

A NEW idea in fare systems will be put into practice by British Airways on May 20 on their Paris services. This idea may be briefly summarised as two-class travel. Passengers will have the choice of flying on faster or slower services according to the fare paid—the former costing 10s. more for the single journey. Two express and three normal services will be operated after the date in question.

Wind Indication

A NEW type of weather-vane indicator for airport use is being developed by Electrical Mechanical Engineering Service, Ltd., of 48, Reginald Road, Bexhill-on-Sea. The movements of the weathervane are transmitted by cable to an illuminated dial which may be placed immediately in front of the chief airport officer.

Atlantic Experiments

WHO is to pilot the *Lieutenant de Vaisseau Paris*, the reconditioned Latecoère on her forthcoming experimental flights across the North Atlantic? Exception is being taken in Paris to the presumed intention of the Air Ministry to put military flying boat pilots in charge when there are a dozen Air France pilots who probably have a greater experience of ocean flying than any pilots in the world.

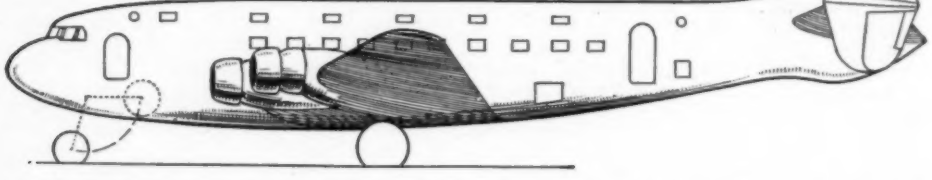
The South Atlantic crossing is just under 2,000 miles, and this is not much shorter than the North Atlantic crossing. If a crew were formed by Air France consisting of Guillaumet (56 crossings) and Rouchon (54 crossings) as pilots, Comet (71 crossings) as navigator, Neri (61 crossings) as radio operator, and Pichard (33 crossings) as mechanic, it would be a crew having, collectively, the experience of 275 crossings—or twenty-one times round a world covered by sea. The only excuse for leaving the experimental flights to military pilots is that the *Paris* is not yet an Air France machine, but belongs to the Air Ministry.

Profit and Loss

Air Transport Costing, by Capt. N. T. McLeod (Sir Isaac Pitman & Sons, Ltd., 7s. 6d.).

AFTER making the necessary exceptions in the case of the larger air transport companies it is probably fair to say that the profit and loss side of the industry in general is carried out by faith and hope rather than by any recognised methods.

Concerns like Imperial Airways have large costing and schedule planning departments, but many others should find a good deal of interest and value in *Air Transport Costing*. This book has been written by a man who has had a good many years' experience as a cost accountant with an operator—in this case, Canadian Airways—and he treats the whole subject from the ground upwards. Costing in its simplest form is first dealt with and then follow elaborations on the scheme, with a statistical summary at the end. Even readers without initial accountancy training should be able to follow the entire course of reasoning, and operator's definitions are given on the first few pages so that there shall be no misunderstanding later on.



BREAKING NEW GROUND. The Douglas D.C.4 is to have "tricycle" landing gear arranged as shown above. An undercarriage of this type is already under test by the U.S. Army on a Douglas amphibian. The tail unit, aerodynamically, seems a retrograde step.

(Right) The general lines of the C. W. Cygnet are well shown in this *Flight* photograph, which also shows how the screen is arranged with quite a pronounced sweep-forward. The cleanness of the cantilever undercarriage is noteworthy.

Side-by-side seating, with a centrally disposed control column, is a feature of the Cygnet. This *Flight* photograph gives an idea of the "entry area"; there is a similar door on the starboard side. In the machine are the two directors of the company, Messrs. S. I. Waddington (nearest camera) and C. R. Chronander.

THE CYGNET FLIES

All-metal Stressed Skin Construction in Miniature : Interesting Features

DURING last week the prototype C. W. Cygnet Minor made a public appearance at Hanworth Aerodrome and flew for the first time in the capable hands of Mr. Hubert Broad. This machine, it may be remembered, is a side-by-side seater cantilever low-wing cabin monoplane which is particularly interesting because it is made entirely of metal. One or two smaller machines with such construction have appeared in the U.S., but this is the first time that such a method of construction has been applied to the private-owner type in this country.

The structure and general layout of the Cygnet was described and illustrated in *Flight* of December 10 last year, and there have been few modifications. Last week, however, it was possible to see how the control and instrument layout had been arranged and to obtain some idea of the range of vision provided for the pilot. The screen is of the forward sloping variety and the entire cabin top is formed by the two transparent doors. In the prototype machine the control column is centrally disposed with slight bias towards the pilot's side, but later machines, particularly those for club or school use, will probably be equipped with full dual control. As it is, the instructor, when seated on the right, could reach the stick very comfortably.

An interesting feature of control system is the arrangement of the fore and aft trimmer in the form of a small hand wheel mounted at the side of the stick itself. This wheel operates on a spring tension device in the usual way. The split trailing edge flaps are operated by the Theed vacuum control system, whereby induction depression, "stored" in a tank, is used to do the work. The actual control is on the dashboard, and the flaps are to be used only for the approach and landing. No intermediate, or take-off position is considered necessary, any extra lift being cancelled out in drag.

The first machine, which is fitted with an 80-90 h.p. Cirrus Minor engine, will be flown in the Isle of Man races by Mr. Charles Hughesdon, and another machine, this time with a Gipsy Major engine, is expected to take part in the King's Cup race later in the year.

The price for the Minor-engined version has been fixed at £895, and Mr. Waddington, one of the directors of the firm, tells us that he has already received a few definite orders and quite a number of interested enquiries, many of them from abroad, where such a form of construction is likely to have a strong appeal. The manufacturers are: C. W. Aircraft, Ltd., Montrose Avenue, Slough Trading Estate, Slough.

From a three-quarter front view the Cygnet has somewhat squat, though not unattractive lines. The prototype machine is fitted with a Cirrus Minor engine. (*Flight* photograph.)

THE MANX AIR RACES

ARRANGEMENTS for the Hanworth-Speke-Douglas air race and for the Island circuits are now being completed, and the first entry has been received from Mr. W. Cunningham, J.P., who has entered a Blackpool and West Coast D.H. Rapide; Capt. Higgins, who flew an 86A last year, will be the pilot.

Competing machines must be at Hanworth before 5 p.m. on Friday, May 28, and the Speke "half-finishing" line will be indicated by the neon light on one side and a white square on the other. The marshal at this point will be Sqn.-Ldr. E. H. Spence, while Mr. J. R. Ashwell-Cooke will be in charge at Hanworth and Major Alan Goodfellow at Ronaldsway.

The London-Isle of Man race will be described by the B.B.C. from a passenger's seat in the Rapide. Last year, it may be remembered, a similar broadcast failed to materialise because the trailing aerial of the D.H.86A disappeared in a low turn.

LUXURY FROM AMERICA

Flyi g Experiences with Two Stinson Reliant Types : Superlative Equipment : The New 450 h.p. Model

WITH cheaper fuel, greater distances and more stable weather conditions, America's private-owner types have been developed on lines which are almost radically different from our own. Save for the more recently introduced lightweights, their machines have always provided comfort and roominess more than comparable with that of the luxury saloon car, and have carried equipment on a scale which would not be possible without the power which the American owner can afford.

The vicious circle of supply and demand in the matter of general performance has brought further refinements in the way of v.p. airscrews and flap gear, and the fully fledged American owner has now developed a scientific technique of the transport flying order. This technique, however, is easily acquired, and, at the same time, it entirely removes the "stunt" atmosphere from the flying business. The pilot of a modern American machine has to use his intelligence rather than his skill—and this, in many ways, is a very good thing.

Since American conditions have permitted the sale of such machines in fair quantities, we are able to take advantage of it, and any British pilot who can, in any case, afford to operate a fairly large machine is at least able to buy it at a reasonable price—even when the import duty has been added thereto. During the period in which the Stinson agency has been in the hands of Brian Allen Aviation, of Croydon, quite a few Reliants have been sold over here. With a price at two-thousand-odd the suggestion is that the machine must have a number of outstanding features.

The latest pair of Reliants arrived over here last week and were erected in a day by A.A.E.S. and Rollasons. Subsequently I was given the chance of flying each in turn for a sufficient length of time to discover that the somewhat fearsome array of devices, different in each case, are not really so fearsome after all. The Reliant is a big machine and it must, consequently, be flown largely on the trimming handle, but its smooth and viceless characteristics permit one to give full attention to the things which really matter. Flying skill, as such, hardly enters into it—and certainly not while the machine is actually in the air.

Of the two machines the first, purchased by Mr. J. R. Bryans, is fitted with a 285 h.p. Wright R-975-E-1, a Hamilton two-position v.p. airscrew, a host of metrically calibrated instruments, Grimes landing lights and Lear radio receiving, homing and D/F. equipment. The other, for Mr. H. Constant (and his third), has a 240 h.p. Lycoming R-680-B engine and electrically controlled Lycoming-Smith v.p. airscrew (standard on all Reliants), more normal instruments and Lear receiving and homing equipment. Without the latter and with a straightforward instrument layout this type costs £2,310 at Croydon—and it may be added that a "standard" Reliant carries full electrical equipment, including a starter, is bonded, wired and shielded for the subsequent addition of radio and a landing light, and has complete dual equipment.

A number of interesting refinements appear on the 1937 model, including a moulded glass windscreen, improved wing-root fairings, and a redesigned staying system for the engine cowling. Those who have examined the Reliants of previous years will not need to be told how the comfort of the passengers has been further considered; it would be impossible to describe the intricacies of such matters in anything less than a special supplement.

Before dealing with the more mundane impressions of a reasonably experienced amateur who has been flying the Reliant for the first time by himself (with technical assistance from Messrs. Allen and Willson), one really interesting mechanical feature of the new models should be explained. While the Wright-engined machine, in this case, has a Hamilton airscrew

Some idea of the car-like appearance of the interior of the Reliant can be gathered from this "peep" through the door of the specially equipped Wright-engined model purchased by Mr. Bryans. The two machines mentioned in this article may be seen above. (*Flight* photographs.)

with a normal push-pull v.p. control immediately below the central throttle plunger, the Lycoming, as already explained, has the standard Smith v.p. airscrew. This is electrically controlled by the throttle lever itself, which is twisted either anti-clockwise or clockwise in order to increase or decrease the pitch. The throttle knob automatically returns to neutral and one simply holds the pressure in one direction or the other until the pitch has been suitably changed. After the take-off, for instance, with the boundary cleared, one can twist the knob momentarily until the pitch-change is felt and the revolutions drop a trifle; one can then retain a semi-fine pitch while climbing to operating height. When it is time to level-off the knob can be held over again until the maximum-coarse position has been reached and the throttle is then adjusted for the correct cruising speed and revolutions. During the glide-in, of course, the throttle is twisted in a reverse direction until the change to fine pitch has been effected. Two green lights provide the necessary indications of pitch-change one way or the other, and the action is sufficiently spring-loaded to prevent any possibility of accidental movement. A very pretty idea indeed.

STINSON RELIANT Model S.R. 9FD.
450 h.p. Wright Whirlwind R-977-E-3 engine.

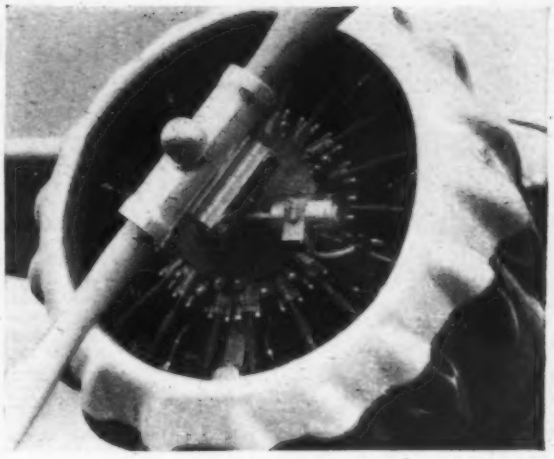
Weight empty	2,935 lb.
Disposable load	1,565 lb.
Cruising speed (9,600 ft.)	178 m.p.h.
" " (5,000 ft.)	169 m.p.h.
Take-off run (calm)	545 ft.
Landing run (calm)	375 ft.
Climb at sea level	1,510 ft/min.
Range	690 miles.
" (maximum fuel)	850 miles.

Concessionaires: Brian Allen Aviation, Ltd., Croydon Airport.

During something like an hour's flying with the two machines I had a reasonable chance of discovering exactly what one could do and what any other newcomer to the type might look out for. Accidentally and otherwise I also made every possible type of approach, from the slow, steep, flaps-down type (with a little motor at the end, perhaps, to assist the levelling-off process) to the long-drawn-out rumble with the flaps up throughout. Each is equally easy and is carried out with the pleasant knowledge that a straight stall produces nothing worse than a pronounced sink which, in an emergency, could be carried on right into the ground with possible material rather than personal damage. One or two minor criticisms which, I feel, ought to be made can be dealt with here and now. While the pilot's view in every essential direction is admirable—particularly in the cruising attitude—one cannot see rearwards; however, the machine is so manœuvreable on the ground that this deficiency is not too serious. The fore-and-aft trimmer handle is in the roof with its axis vertical; though easy enough to reach and to operate, the action is not natural, and it was some time before I learnt to turn it in the appropriate direction without first reading the notice. That is a matter for practice. At certain speeds the distorted airflow behind the depressed flaps causes an elevator shudder which is mildly disturbing without being in the least violent or affecting the control itself.

In common with a great many modern machines the Reliant must be pulled off the ground if the run is not to be unreasonably prolonged, and one does, in fact, bring the control wheel right back almost to the landing position—so taking the skill out of the take-off process. If the movement is made before sufficient speed has been obtained the machine merely bounces once or twice before becoming air-borne, and on a large aerodrome there would be no need to force the tail up at the commencement of the run; one would simply wait until ample speed had been obtained and then pull the control well back.

Once in the air the engine is throttled back a trifle, the nose trimmed up to the correct angle of climb, the airscrew pitch changed, and the throttle again opened until revolutions, air speed and manifold pressure are as they should be. Thereafter, one can remove one's feet from the pedals and drive the machine as one would a car—arranging one's own hills and dales with the aid of the trimming handle. The Reliant turns accurately and steeply on the ailerons alone and, if trimmed in a slight climb, will go on turning accurately without attention of any kind. It is not, in fact, automatically stable, but remains quite happily in almost any attitude in which it is left; "positive stability" is probably the expression to use in this case. The engine cowling lies well below the horizon in level flight.



The latest Lycoming-Smith electrically controlled airscrew is now a standard feature of all Reliants; its method of control is both interesting and ingenious. This *Flight* photograph also shows the new type of engine cowling.

During an approach it is probably better to throttle back slowly while trimming and returning to fine pitch, leaving the pneumatically operated flap switch alone until the machine is pretty well over the aerodrome boundary. With the flaps up or down the machine glides smoothly without attention, and even from a very slow approach there is still plenty of time to level-off accurately before the stall, which occurs in a vague sort of manner and need not be awaited; without fear of ballooning one can "manufacture" this stall at any speed below, say, 60 m.p.h. simply by hauling back on the column. The Reliant, in other words, may be landed satisfactorily according to the rules, and is only distressed if allowed to drop heavily on to the wheels with the column still in the neutral position.

Quite recently a new and more powerful model of the Reliant has been produced, and the weights and performance figures of this machine are given in the "box" on this page. As one might expect, these figures are interesting, and the machine has a good deal of equipment even in its standard form. This includes a generator, landing lights, a sensitive altimeter with a millibar scale and various special temperature indicators. Special equipment can include a constant-speed airscrew, with the necessary mixture analyser, radio and amphibian float gear. In its standard form the 450 h.p. machine will be sold in this country for £4,200.

INDICATOR.

Italy Claims Altitude Record

AS we go to press it is learned that Colonel Mario Pezzi, in a Caproni 161 with 14-cylinder Piaggio PXI engine, is claimed to have reached 51,361 feet, thus exceeding by 1,417 feet the record gained for Gt. Britain by Sqn. Ldr. Swain last September.

Air Survey Reorganisation

IT is announced by H. Hemming and Partners, Ltd., the air survey specialists, that the Aircraft Operating Co., Ltd., which carries out similar work in South Africa, has been put into liquidation and that a new company is being formed immediately under the same title so that goodwill and connections may be preserved.

This action has been made necessary through the acquisition of the controlling shares of the Aircraft Operating Co., Ltd., and of its subsidiary, the Aircraft Operating Company of Africa (Pty.), Ltd., by the A.O.C. Trust, Ltd., of which Hemming and Partners, Ltd., hold the controlling shares.

Mr. R. T. D. Stoneham is chairman of the A.O.C. Trust, Ltd. He is also chairman of Aerofilms, Ltd., Hemmings' operating company in the British Isles.

The Price Trend

PERCIVAL AIRCRAFT, LTD., regretfully announce that the prices of all their aircraft are increased as from May 4. They state that the steady increase in the cost of labour and raw material has amounted in some cases to as much as 20 per cent., and it has become impossible to refrain any longer from passing part of the burden on to the customer.

The TREND of INVENTION

Recent Aeronautical Patents Reviewed

Anti-corrosion Surfaces

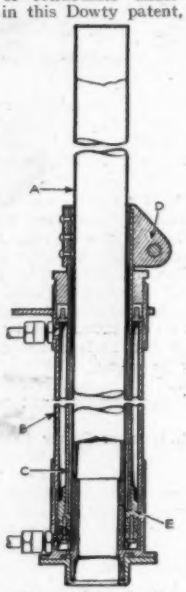
IN order to prevent the corrosion of metal aircraft structures by their contact at high speed with the atmosphere and with sea water, particularly when subjected to tropical temperatures, the following method of protective coating is suggested.

The metal surface is first roughened by sandblasting or etching and a very thin coating of pure, or almost pure, aluminium is sprayed on. This is then covered with a coating of lanoline solution, lacquer or air-drying synthetic lacquer. In this way a protective layer is formed with the minimum increase in weight.—*Patent No.* 457038: *Metallisation, Ltd., and W. E. Ballard.*

Undercarriage Jacks

AN unusual form of jack construction that has been necessitated for certain types of retractable undercarriage is described in this Dowty patent, as are the types of equipment in which it may be used.

The jack consists of a tubular stem A which is attached to the aircraft structure at both ends and which has therefore substantial beam strength when so mounted. A concentric cylinder B is also rigidly attached to it. Sliding on the stem A is the plunger sleeve C, which is capable of movement and to which is attached the lug D. To this in turn is fixed the link to be operated. At one end of the plunger sleeve is an annular piston E, with a double-acting packing which forms a fluid-tight joint both with the inner stem A and the outer cylinder tube B. Fluid, under pressure, is admitted by one of the pipes connected to the outer tube B and so causes the plunger C to move on the stem A.

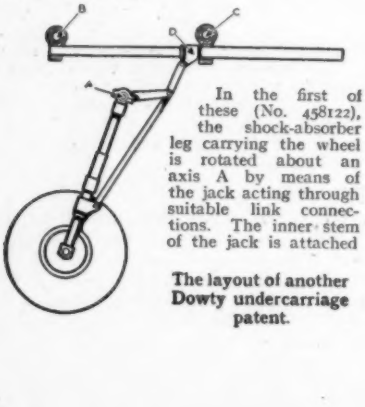


One of Mr. G. H. Dowty's many ingenious hydraulic jack designs, described in the accompanying paragraph.

The jack may be locked at either end of its stroke by a spring-loaded plunger entering sockets on the stem A, the lock being disengaged by the fluid pressure.—*Patent No.* 457983: *G. H. Dowty.*

Undercarriages

UNDERCARRIAGES in which the above type of jack can be used are also shown in two other patents granted to G. H. Dowty.



The layout of another Dowty undercarriage patent.

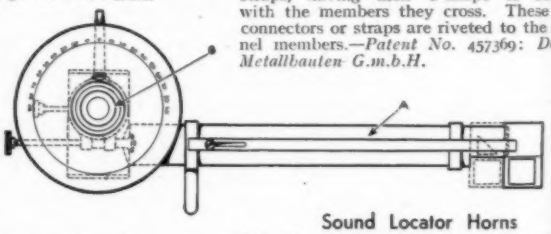
In the first of these (No. 458122), the shock-absorber leg carrying the wheel is rotated about an axis A by means of the jack acting through suitable link connections. The inner stem of the jack is attached to the aircraft structure B and C and the ram D slides along the stem between these two supports. The novelty in this patent lies in the mounting of the jack in a position which is approximately at right angles to the undercarriage when the latter is in its extended position and the supporting of the jack in a fixed alignment to resist cross loads.

In the second patent (No. 458187) a similar mounting for the jack is used and the undercarriage leg is swung to its returned position by an articulated radius rod. The arrangement enables proper accommodation for a sufficiently large jack to be used. A form of bell-crank lever is used, and is attached to the ram of the jack which slides upon the stem between the fixed supports.—Patents Nos. 458122 and 458187: *G. H. Dowty.*

Drift Measurement

IN order to determine the angle of drift of an aircraft it is proposed to use an optical instrument which consists of a telescope A, fitted with prisms at each end which enable it to be used in the manner of a periscope. It is mounted in such a manner that it projects over the side of the aircraft, and by looking into the eyepiece B the navigator has a view of the ground.

In the eyepiece there is an index line, which is capable of rotation by a rack and pinion device. This line is rotated until an object on the ground travels along it and by reading the angle through which the eyepiece has been rotated from a given datum line, the angle of drift is determined. —*Patent No.* 458323: *H. C. F. Ellis.*



A drift sight as a prismatic optical instrument—Patent No. 458323 (H. C. F. Ellis).

Rotative-wing Aircraft

IN rotative-wing aircraft in which the pitch angle of the rotor blades is automatically regulated, being zero during the driving of the rotor and then increased to the normal pitch for auto rotation when the driving torque is removed, there is a risk, if the engine should stop or slow down, of the aircraft being suddenly lifted. A reapplication of the driving torque under these conditions would immediately decrease the pitch angle to zero, resulting in a heavy fall of the aircraft.

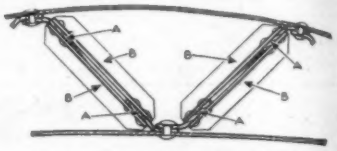
This risk would be eliminated if the reapplication of the drive to the rotor subsequent to an engine failure during the starting operation is prevented, and the patent describes a method by which this is accomplished.

The drive from the engine is taken through a pinion on a screwed shaft engaging a gear ring on the rotor. The pinion runs up a screwed shaft to engage the gear ring and down again should the driving torque cease due to engine failure. A catch device then comes into operation to prevent the pinion rising a second time until the clutch has been released.—*Patent No.* 452365: *Juan de la Cierva.*

Another method by which the risk mentioned above can be eliminated is to cause the automatic decrease of the pitch angle of the rotor blades when the aircraft lands. This is effected by a cable transmission from a plunger operated by the shortening of the shock-absorber leg when the aircraft touches-down.—*Patent No.* 452397: *Juan de la Cierva.*

Metal Construction

TWO patents recently granted to the Dornier Company relate to constructional details. The first (No. 458286) is concerned with metal wings, the spars of which are in the form of lattice girders which are built up from angle bars bent to include an obtuse angle and which are connected by a latticework of ordinary angle bars. In the illustration, which shows a section of a wing, there are a number of obtuse-angle bars A,



The Dornier constructional system.

and these are connected by a series of bars B of right-angle section. The obtuse angle is stated to simplify riveting and at the same time to avoid the presence of projecting ribs on the exterior of the wing, which defects have been present in previous constructions of this type.

The second patent (No. 457369) describes a construction for making a wall or partition of sheet metal, such as the covering of a wing or the outer wall of the fuselage, whereby reinforcing members are first built up as a frame and then applied or fixed to the sheet metal skin. The reinforcement consists of flanged U-shaped channel members which cross one another, long lengths running in one direction and short, separate sections meeting these at right angles. The crossings of these members are joined up by cross-shaped straps, having their U-shape to conform with the members they cross. These cross connectors or straps are riveted to the channel members.—*Patent No.* 457369: *Dornier Metallbauten G.m.b.H.*

Sound Locator Horns

IN order to detect the presence and also to estimate the direction of aircraft, receiving horns are used to collect the sound waves emanating from the aircraft, the horns being mounted in such a manner that they can be adjusted angularly in any direction.

One of the difficulties with locators of this type is to make them small, compact, simple and robust, and at the same time to reduce extraneous sounds, such as wind noises, background noises, etc.

A construction is described in this specification which aims at overcoming these difficulties. It consists of an interior horn of conical shape made of wood, a packing of corrugated sound-absorbing material such as glass wool, with a reinforcing frame and an outer cover. Unwanted noises are by this construction prevented from reaching the ear of the operator by the provision of filters. Methods of mounting these horns are also described.—*Patent No.* 460267: *Sperry Gyroscope Co. Inc.*

R.Ae.C. OFFICIAL NOTICES

The F.A.I. Conference : Low Flying at Newmarket : Zurich Meeting : Club Appointments

AT the invitation of the Royal Aero Club the Fédération Aéronautique Internationale will hold its annual conference in London on June 22-27.

The F.A.I. is the recognised international body embracing all the national aero clubs of the world. It is the supreme controlling authority for the sport of flying and for international world records. It has also for one of its main objects the development of international air touring and the removal of the barriers which hinder it.

Founded in Paris in 1905 by eight countries, including Great Britain, the F.A.I. now consists of thirty-five national organisations. Since its inception it has held its annual conference in all countries of the world, the last three being in the United States, Yugoslavia and Poland, respectively.

The committee of the R.Ae.C. is naturally anxious to arrange an attractive programme for the entertainment of the foreign delegates attending this conference. It is anticipated that approximately 100 delegates will attend, and the committee is also anxious that the hospitality extended should be on the same scale as that which has in the past been offered by the other countries.

To mark the importance of this conference, H.M. Government will give an official banquet to the delegates on Friday, June 25. Apart from the general and committee meetings of the F.A.I. which will take place daily, the R.Ae.C. will entertain the delegates to a luncheon at the Savoy Hotel. The Under Secretary of State for Air, the Right Hon. Sir Philip Sassoon, is holding a reception at 45, Park Lane, the Marchioness of Londonderry is giving a cocktail party at Londonderry House, and the delegates will visit the R.A.F. Display at Hendon as guests of the Royal Aero Club.

On the final day, Sunday, June 27, the delegates will visit Ratcliffe, Leicester, as the guests of Mr. W. Lindsay Everard, M.P., chairman of the Royal Aero Club.

For this visit the Club wishes to provide air transport to Leicester and return for about 100 delegates. It is proposed to start from Heston at about 10.30 a.m., returning at 3 p.m. Mr. Lindsay Everard will be grateful if private owners willing to assist will kindly send in their names to the Royal Aero Club, 119, Piccadilly, London, W.1, with particulars of aircraft and seats available.

It is estimated that a sum of £500 should be at the disposal of the committee in order to carry through the week's programme. It is appreciated that only last year an appeal was made to members and private owners to support the Week-End Aerien, which appeal met with a most generous response. The Week-End Aerien was for the entertainment of foreign private air tourists, whereas the Federation, while including many such tourists, is mainly concerned with the representatives of the national aero clubs whose function in their respective countries does so much to encourage the progress of international aerial circulation.

The committee hopes that all members will realise the important part that the Federation has played in international aviation matters, and give such financial support to the Club as will enable it to offer suitable entertainment to these important delegates.

* * *

The Jockey Club has informed the Royal Aero Club that many aeroplanes arriving at the recent Newmarket Races crossed very low over the paddock.

The stewards of the Jockey Club have requested the R.Ae.C. to bring to the notice of all pilots the undesirability of flying low over the paddock when racing is taking place on the Rowley mile course with so many valuable horses engaged.

The Royal Aero Club would be grateful if all pilots visiting Newmarket would give careful attention to the request of the Jockey Club.

* * *

The following British entries have so far been made for the Zurich International Aviation Meeting, July 23 to August 1: Miss Constance Ruth Leathart, Alex Monteith, Reginald Presland, Charles Gardner, Miss L. Dillon, Miss Mabel and Miss Sheila Glass, Robert Somerset.

* * *

The following appointments have been made by the Club for the year 1937-38 :—

CHAIRMAN :—W. Lindsay Everard, M.P.

VICE-CHAIRMAN :—F. Handley Page, C.B.E.

RACING COMMITTEE :—W. Lindsay Everard, M.P., Capt. H. S. Broad, Major J. S. Buchanan, C.B.E. ; Flt. Lt. P. W. S. Bulman, M.C , A.F.C. ; Major A. Goodfellow ; R. Ashley Hall ; A. C. S. Irwin ; Capt. R. L. Preston ; P. Q. Reiss ; Major R. H. Thornton, M.C.

PRIVATE OWNERS AND AIR TOURING COMMITTEE :—Air Vice-Marshal A. E. Borton, C.B., C.M.G., D.S.O. ; D. P. Cameron ; Flt. Lt. C. Clarkson ; The Marquess of Douglas and Clydesdale, A.F.C., M.P. ; J. G. Crammond ; W. D. McPherson ; W. R. D. Perkins, M.P. ; Major H. A. Petre, D.S.O., M.C. ; W. L. Runciman ; G. H. Wilson-Fox.

HAROLD E. PERRIN,
Secretary.

The "Hindenburg" Disaster

WITH amazement and horror, intensified by the seeming "impossibility" of such an occurrence, the world learned last Friday morning of the destruction by fire of the German Zeppelin L.Z.129, or *Hindenburg*, at Lakehurst, New Jersey, the previous evening—Thursday, May 6.

The airship reached the neighbourhood of New Jersey at 4 p.m., and cruised round for three hours to allow a thunderstorm to clear. She approached the mooring mast. From that moment there are many conflicting accounts, some of which say that faulty mooring manœuvres caused her tail to hit the ground. Whatever happened, there was a belch of burning hydrogen, and in a few seconds the ship fell to the ground, ablaze from stem to stern of her 803ft. length.

During the following days widely divergent estimates of the death-roll appeared. Last Monday it was authoritatively stated to be 35, of which number about two-thirds consisted of members of the crew.

Among the victims who died in hospital from their injuries was Captain Ernst August Lehmann, who, since the war days, when he led raids over Britain, has shared with Dr. Eckener a leading part in bringing Germany's commercial airship services to their present strong position. Flying sometimes as commander, sometimes as chief technical adviser to the company, he had made scores of Atlantic crossings since his first one in the Z.R.3 in 1924. From 1924 to 1927 he helped to organise the American branch of the Zeppelin Company at Akron.

A discussion of possible causes of the disaster, and some Editorial comments, appear on pages 466 and 467.

New York-Paris Race Entries

AS recorded briefly in last week's issue of *Flight*, 22 machines have been entered for the air race from New York to Paris. The race period extends throughout August, each pilot picking a day to suit himself, and the result being decided by individual timing.

No.	Entrant.	Nationality.	Aircraft and Engine.
1	Sir Hugo Cunliffe-Owen ...	G.B.	Clyde Clipper (2 Rolls-Royce Kestrel).
2	A. E. Clouston	G.B.	De Havilland Comet (2 Gipsy).
3	Miss Amy Johnson ...	G.B.	Caudron Goeland (2 Renault).
4	Alex Papana	R.	Bellanca (2 Menasco, 1 Ranger).
5	French Air Ministry ...	F.	Farman 2300 (4 Hispano).
6	" "	F.	M. Bloch 160 (4-engined).
7	" "	F.	Amiot 370 (2 Hispano).
8	Attilio Biseo	I.	Savoia-Marchetti (3-engined).
9	Angelo Tondi	I.	" " "
10	Samuele Cupini	I.	" " "
11	Umberto Fiori	I.	" " "
12	Antonio Lippi	I.	" " "
13	Guiseppe Gaeta	I.	Fiat 20.
14	Enrico Rolandi	I.	"
15	Aldo Anzani	I.	Procellaria-1 (2 I.-F. Asso).
16	Vittorio Suster	I.	"
17	Prince Cantacuzene ...	R.	Caudron Typhon (2 Renault).
18	Societe Transoceanic ...	F.	Couzinet 10 (2 Hispano).
19	Joe Thorne	U.S.A.	Lockheed (twin-engined).
20	Henry Merrill	U.S.A.	" "
21	James Mattern	U.S.A.	" "
22	Karl Linder	S.	Junkers Ju. 86 (2 P.W. Hornet).

Nationality (determined by club through which entry is made) : G.B., Great Britain ; R., Roumania ; F., France ; I., Italy ; S., Sweden.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

FORMATION OF STATION HEADQUARTERS

A station headquarters will form at Cranfield, near Bletchley, Bucks, on June 1, on which date the station will be placed under the command of the A.O.C.-in-C., Bomber Command, in No. 1 (Bomber) Group. The aerodrome may be used with effect from May 4, for aircraft of personnel visiting the station on duty in connection with the opening, but no facilities of any kind will be available. The aerodrome will not be available for general use until July 6.

MORE NEW SQUADRONS

No. 50 (Bomber) Squadron formed at Waddington on May 3. The squadron will be equipped with medium bomber aircraft and placed in the Bomber Command, in No. 3 (Bomber) Group.

No. 110 (Bomber) Squadron will form at Waddington on May 18. The unit will be equipped with medium bomber aircraft and placed in the Bomber Command, in No. 3 (Bomber) Group.

No. 113 (Bomber) Squadron will form at Hemswell on May 18. The squadron will be equipped with medium bomber aircraft and placed in the Bomber Command, in No. 3 (Bomber) Group.

No. 115 (Bomber) Squadron will form at Marham on May 18. The unit will be equipped with heavy bomber aircraft and placed in the Bomber Command, in No. 3 (Bomber) Group.

No. 233 (General Reconnaissance) Squadron will form at Tangmere on May 18, and will be placed in the Coastal Command, in No. 16 (Reconnaissance) Group.

LONG SERVICE AND GOOD CONDUCT MEDAL

The Long Service and Good Conduct Medal has been awarded to the undermentioned airmen:—

W/O.s Brown, A. H., Fowler, S. S., Hill, E. J. G., Killick, C. A., Laurie, H. H., Ralphs, W. J., Saunders, E. T., M.M., Stacey, D., Taylor, A. W., Wendon, W. E., W/O.2s Hannan, A. C., and Jervis, H. W., Flt. Sgts. Adams, F. C., Atkinson, G. W., Bennett, J. A., Bowley, W. E., Boyer, J., Browne, S. F., Buckland, A. M., Court, J. W., Cowdrey, G. R., Cox, C. A., Dalton, W. R., Danes, R. E. W., Dunn, W. E., Easdown, W. A., Fletcher, L., Fletcher, P., Fry, H. C., Graydon, W., Hancock, W. R., Harman, H. T., Harrison, J. E., Hinton, R. J., Hodgson, A., Horton, H., Knight, H. F., Koch, C. T. D., Lamden, S. J. D. (deceased), Lawson, D., Ling, W. G., Newble, P. G., Newton, S. R., Nicholl, A. E., O'Donnell, J., O'Neill, L., Picton, P. F., Purdie, A., Radcliffe, J. C., Richardson, J. E., Ridge, A. H., Robinson, L., Rodd, F. A., Rowell, R. F., Russell, J., Savory, J. R., Scammell, W., Stewart, R., Stirling, D., Sutherland, J. T., Thomas, G. W. J., Thomson, G. O., Ubee, A. E., Wade, M., Williams, A., Williams, C. M., A/Sgts. Allen, A., and Anderson, W. A. T., Sgts. Bennett, C., Bennett, G., Berry, A., Body, G. A., Breach, F. H., A/Sgt. Burns, E. A., Sgts. Burrows, A., Burrows, F. O., Busby, R. A., Cannon, A., Chadwick, J., Cock, A. E., Collins, L. R., A/Sgts. Collins, S. G., and Cookson, S., Sgts. Dingwall, H. G., A.F.M., Ferris, S., Firman, F., Fisk, I. J., Flatman, A., Francis, E. V., Garbett, E. W., Gardiner, W. A., Garrett, E. L. W., Garvock, G., A/Sgt. Gransmore, T. E., Sgts. Harris, R. G., Hicks, J. R., Hiskett, W. G. A., Horne, W. H. B., Humphrey, H. W., Jackson, R., Jones, A. F., Jones, E. C., Keene, F. F. H., A/Sgt. Knight, F. E., Sgt. Law, J. R., A/Sgt. Lewis, L. R., Sgts. Loader, W. J. C., and Long, E. F., A/Sgts. Longley, T. W., and Luscombe, F. C., Sgts. Masters, D., Mitchell, J., Morter, F. W., Newbound, F. L., Palmer, W. F., Pheby, G. W., Phelps, C. H. A., A/Sgt. Porter, H., Sgts. Rainbow, J. W., Ridealgh, C., Ridley, A. H., Roden, T. C., Roylance, E. W., Ruddock, G. E., A/Sgt. Smith, E. V., Sgts. Smith, J. R., and Smith, L., A/Sgts. Snowball, A. C., and Stanton, N. E. W., Sgts. Stephens, A. H., Steward, S. F., Stone, W. E., Stroud, R. C., Sutton, M., Tandy, R., M.M., Thompson, A. F., Thorne, B. C., Toplis, W. D., A/Sgts. Trunchion, C. J., and Walker, J. W., Sgt. Winter, H. W. F., A/Sgt. Wright, H. F., Cpls. Biggs, R. O., Brewin, F. C., Callingham, F. H., Cooke, R., Crighton, W. S. C., Edmondson, A., Felton, W. J., Ferguson, J., Gray, D., M.M., Howting, S., Kelleher, T. E., Low, W. D., Macdonald, A., Mackenzie, R. W., Meider, C. A., Montgomery, G., North, H., Page, C. H., Porter, E. W., Potter, J. E., Soady, W. J., Townsend, W. L., Wade, N. F., Whillock, H., Wilson, G. R., Window, H. D. H., Wood, A., M.C., Wynn, O., L.A/C.s Durack, A., and Nelmes, F., A/C.1 King, A. J.

R.A.F. AND THE INDIAN AIR FORCE

An amendment to the King's Regulations and Air Council Instructions has been adopted in reference to occasions when the Royal Air Force and Indian Air Force are acting together.

Under the provisions of the Air Force Act, whenever bodies of the Indian Air Force and the R.A.F. (including the R.A.F. Reserve and the Auxiliary Air Force) are serving together in such circumstances that the provisions of any joint orders made by the Air Council and the Governor-General of India apply to such bodies, then a member of either body will, subject to the terms of such joint orders, have the like powers of command over members of the other body as if he were a member of that body holding relative rank.

Provision has been made by the Air Council and the Governor-General for the application of section 184B of the Air Force Act to officers of the R.A.F. or Indian Air Force who, when any body of the R.A.F. is serving on the same station with any body of the Indian Air Force, are appointed by the C.O. of the station to carry out duties necessary for the proper administration or discipline of the station. Such officers will, in relation to the other body, be treated and have all such powers (other than powers to punish) as if they were officers of that other body from pilot officer to wing commander, inclusive. Officers, N.C.O.s, and men of the Indian Air Force will become subject to the Air Force Act when attached to, doing duty with, or otherwise acting as part of any portion of the R.A.F. which is serving outside India and is not under the command of the A.O.C., R.A.F., India.

REUNION DINNERS

It is proposed, if sufficient support is forthcoming, to hold separate dinners in London on Saturday, May 29, for past and present members of all ranks of No. 5 (A.C.) Squadron, and those of No. 3 (Indian) Wing, respectively, who were on the strength of, and actually serving with, the squadron or wing during the Quetta earthquake on May 31, 1935. Those officers and airmen concerned who wish to attend, should communicate at an early date with Sqn. Ldr. C. N. Ellen, D.F.C., Delves, Farnborough Road, South Farnborough, Hants.

A twenty-fifth anniversary reunion dinner for past and present officers of the Central Flying School will be held on Friday, June 18, at the May Fair Hotel, London, W.1. Officers desirous of attending are requested to communicate with the Honorary Secretary, C.F.S. Dinner, Central Flying School, Royal Air Force, Upavon, Marlborough, Wilts.

A 21st anniversary reunion dinner for past and present Officers of No. 56 (F.) Squadron will be held on Friday, June 11, at the Savoy Hotel, London, at 19.30 hours for 20.00 hours. The price of tickets is 12s. 6d. each (exclusive of wines). Officers desirous of attending are requested to communicate with P/O. I. S. Soden, No. 56 (F.) Squadron, North Weald, Epping, Essex.

ROYAL AIR FORCE GAZETTE

London Gazette, May 4, 1937

General Duties Branch

Flt. Cadet M. P. A. Craig Mooney, having successfully passed through the Royal Air Force College, Cranwell, is granted a permanent commission as Pilot Officer with effect from and with seniority of April 8; A. A. T. Bulloch, having successfully passed through the Royal Air Force College, Cranwell, is granted a permanent commission as Pilot Officer on probation with effect from April 21 and with seniority of August 1, 1936.

The following Pilot Officers on probation are confirmed in their appointments on the dates stated:—A. B. Greenaway (March 9); V. G. L. D. Byrne (April 6).

The following Acting Pilot Officers on probation are confirmed in their appointments and graded as Pilot Officers on the dates stated:—G. R. E. Gregory, W. S. Pryde (January 27); G. V. Aylott, L. M. Beavis, R. M. Blennerhassett, H. L. McL. Bulloch, T. A. Bunting, D. O. Butler, W. P. Cambridge, P. Corbishley, J. W. E.

Davies, C. D. Fox, K. McL. Gillies, I. R. Gleed, I. P. Grant, D. J. Gudgeon, G. R. G. Henderson, M. F. Hendry, D. J. How, B. O. Huxtable, A. P. G. Hyde, N. L. Ievers, P. G. Jameson, D. I. Jobson, G. C. O. Key, W. M. Lupton, A. N. Macfarlane, R. A. G. Morgan, J. F. Newman, G. E. Newton, G. K. Peacock, R. D. E. Pitcairn, H. F. Plank, B. J. Rogers, L. G. Schwab, W. T. Scott, R. H. Sleigh, N. J. Starr, J. N. de M. Tyrrell, R. N. Wall, G. S. Woodwark (March 9); T. W. Lamb (March 12); J. W. H. Bray, J. Ellis, B. R. O'B. Hoare, L. K. Keith, B. J. E. Lane, R. A. B. Learoyd, A. C. Leggate, S. N. L. Maude, I. B. N. Russell, E. R. D. Vaughan (March 23).

Acting Pilot Officer on probation J. A. F. Mertens is graded as Pilot Officer on probation (February 21).

The following Flying Officers are promoted to the rank of Flight Lieutenant (April 15):—N. G. Mulholland, A. C. Mills.

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—B. Samson, K. J. Rampling (March 14); R. M. Fenwick-Wilson (March 24); R. N. Smith, D. Walker, S. E. F. Curry, G. P. Flew, E. G. Campbell-Voullaire, B. G. Carroll (April 14); F. S. D. Burgis, D. C. Yorke, A. C. Brown, S. R. R. Smith (April 19).

Lt. P. L. Jamison, R.N., Flight Lieutenant, R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (December 19, 1936); Flt. Lt. R. B. Brown is transferred to the Reserve, Class C (May 4); F/O. C. M. B. Renshaw relinquishes his short-service commission on account of ill-health (May 1); the short-service commission of Acting Pilot Officer on probation A. G. Craig-Brown is terminated on cessation of duty (April 24).

Equipment Branch

Wing Cdr. G. A. Hilliar is placed on the retired list (May 1).

Medical Branch

F/O. F. L. Whitehead, M.D., C.M., is promoted to the rank of Flight Lieutenant (March 29).

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Senior Sister Miss M. E. R. Edwards is promoted to the rank of Matron (May 1); Matron Miss M. W. Walker is placed on the retired list at her own request (May 1).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

Flt. Lt. W. R. Castings, M.B.E., (R.A.F., retired), is granted a commission in that rank in Class C (November 26, 1936); B. Heath is granted a commission as Pilot Officer in Class AA (May 4).

The following are transferred from Class A to Class C on the dates stated:—Flt. Lt. G. Rose (April 7); F/O. B. J. Hurren (February 26, 1936); F/O. L. W. Thres (March 11, 1936); P/O. A. D. MacLeod (October 1, 1936).

The following Flying Officers are transferred from Class C to Class A on the dates stated:—W. F. Hilchie (April 11, 1936); H. E. Mayes (March 18); T. J. Shaw (April 8).

F/O. A. K. L. Stephenson is transferred from Class C to Class AA (ii) (March 19); F/O. C. D. Barnard relinquishes his commission on completion of service July 17, 1936); F/O. F. D. Paul relinquishes his commission on account of ill-health (May 5); the notification in the *Gazette* of March 16 concerning Engr. Cdr. W. A. Howsego (R.N. Retired) is cancelled.

AUXILIARY AIR FORCE

General Duties Branch

No. 500 (COUNTY OF KENT) (BOMBER) SQUADRON.—D. G. Mabey is granted a commission as Pilot Officer (April 7).

No. 604 (COUNTY OF MIDDLESEX) (FIGHTER) SQUADRON.—P. W. D. Heal is granted a commission as Pilot Officer (March 24).

No. 611 (WEST LANCASHIRE) (BOMBER) SQUADRON.—S. H. Bazley is granted a commission as Pilot Officer (April 4).

ROYAL AIR FORCE INTELLIGENCE

General Duties Branch

Wing Commanders.—L. H. Slatter, O.B.E., D.S.C., D.F.C., to R.A.F. Station, Feltwell; to command, 13.4.37. C. W. Hill, to R.A.F. Station, Tangmere; to command, 13.4.37. A. C. Collier, to D.O.I., Dept. of C.A.S., Air Ministry, 9.4.37. S. Graham, M.C., to No. 10 (Bomber) Squadron, Dishforth; to command, 15.4.37. W. E. Swann, to R.A.F. Station, Church Fenton; to command, 19.4.37. G. T. Richardson, to No. 97 (B) Squadron, Leconfield; to command, 15.4.37.

Squadron Leaders.—F. R. D. Swain, A.F.C., to No. 1 (Fighter) Squadron, Tangmere; to command, 13.4.37. R. R. Nash, to Dept. of C.A.S., Air Ministry, vice Sqn. Ldr. E. P. M. Davis, A.F.C., A.M., 1.4.37. R. J. Legg, to No. 8 Flying Training School, Montrose; for duty as Chief Flying Instructor, 18.4.37. F. G. H. Ewens, to Headquarters, R.A.F., India, New Delhi; for Signals duties, 30.3.37. E. Burton, to No. 90 (B) Squadron, Bicester; to command, 19.4.37. G. C. Bladon, to No. 42 (T.B.) Squadron, Donibristle; to command, 9.4.37. J. H. Hargroves, to No. 37 (B) Squadron, Feltwell; for flying duties, 26.4.37.

Flight Lieutenants.—A. Franklin, to No. 209 (Flying Boat) Squadron, Felixstowe, 28.3.37. E. J. H. Lindley, to No. 4 Armament Training Camp, West Freugh, 16.4.37. D. J. Eayrs, to Central Flying School, Upavon, 19.4.37. A. T. H. Willis, to No. 149 (B) Squadron, Mildenhall, 12.4.37. F. C. Daubney, to No. 5 (A.C.) Squadron, Chaklala, India, 30.3.37. R. S. Howe, to No. 39 (B) Squadron, Risalpur, India, 1.4.37. F. S. Gardner, to Central Flying School, Upavon, 24.4.37. H. R. A. Edwards, R. L. Wilkinson, to Central Flying School, Upavon, 19.4.37. R. H. Maw, to No. 105 (B) Squadron, Harwell, 26.4.37.

Flying Officers.—N. de W. Boult, to Home Aircraft Depot, Henlow, 28.3.37. J. K. M. Drysdale, I. C. B. Worthington-Wilmer, to No. 2 (A.C.) Squadron, Hawkinge, 25.4.37. A. R. W. Shipley, to No. 4 (A.C.) Squadron, Odiham, 25.4.37. R. H. Humphries, —. MacDougall, to No. 13 (A.C.) Squadron, Odiham, 25.4.37. J. F. Maffett, W. G. Tailyour, to No. 16 (A.C.) Squadron, Old Sarum, 25.4.37. D. M. H. Craven, to Armament Training Camp, North Coates Fitties, 12.4.37. L. R. Stewart, to No. 76 (B) Squadron, Finningley, 12.4.37.

Pilot Officers.—M. W. Donaldson, to No. 7 (Bomber) Squadron, Finningley, 7.3.37. J. T. Bouwens, D. Fortnum, to No. 75 (Bomber) Squadron, Driffield, 7.3.37. R. Clarke, to No. 97 (Bomber) Squadron, Leconfield, 7.3.37. L. R. Field, to No. 38 (Bomber) Squadron, Mildenhall, 7.3.37. P. A. Gilchrist, to No. 51 (Bomber) Squadron, Boscombe Down, 7.3.37. H. D. Green, P. A. Matthews, to No. 58 (Bomber) Squadron, Boscombe Down, 7.3.37. C. A. Richardson, to No. 166 (Bomber) Squadron, Leconfield, 7.3.37. Y. P. Wilson, to No. 9 (Bomber) Squadron, Scampton, 7.3.37. L. S. Lawrence, to No. 61 (Bomber) Squadron, Hemswell, 7.3.37. J. H. Irvin, to No. 201 (Flying Boat) Squadron, Calshot, 28.3.37. A. C. R. Thompson, to No. 201 (Flying Boat) Squadron, Calshot, 28.3.37. J. Barrett, to No. 204 (Flying Boat) Squadron, Mount Batten, 28.3.37. J. B. Burnett, to No. 228 (Flying Boat) Squadron, Pembroke Dock, 28.3.37. J. P. Owens, to No. 228 (Flying Boat) Squadron, Pembroke Down, 28.3.37. A. Aitken, A. G. Duguid, D. A. Kerr, J. B. Stewart, F. W. S. Turner, F. Holman, to No. 149 (B) Squadron, Mildenhall, 12.4.37. F. S. Stapleton, to No. 603 (City of Edinburgh) (B) Squadron, 20.3.37. J. J. E. Coats, to No. 812 (F.T.B.) Squadron, 19.3.37. W. T. Dennis, to Marine Aircraft Experimental Establishment, Felixstowe, 19.4.37. C. E. Slee, R. W. Stewart, J. E. Dutton, to Aeroplane and Armament Experimental Establishment, Martlesham Heath, 19.4.37. H. M. Crump, W. H. R. N. Newton-Howes, to Air Observers School, North Coates Fitties, 19.4.37. P. W. Hartley, to Air Observers School, North Coates Fitties, 26.4.37. R. H. H. L. Oliphant, to No. 54 (F) Squadron, Hornchurch, 9.4.37. M. W. Hamlyn, to No. 5 Armament Training Camp, Sutton Bridge, 26.4.37. F. Harrison, to No. 4 Armament Training Camp, West Freugh, 26.4.37. C. E. Levitt, to Armament Training Camp, Leuchars, 19.4.37. F. L. Chadwick, B. P. Jones, P. H. Rebbeck, to No. 76 (B) Squadron, Finningley, 12.4.37. J. Adam, T. G. W. Appleby, V. Mitchell, A. R. Vaughan Williams, E. R. White, to No. 37 (B) Squadron, Feltwell, 26.4.37. S. M. Bird, to No. 3 Armament Training Camp, Sutton Bridge, 12.4.37. W. G. Lockhart, to Armament Training Camp, North Coates Fitties, 15.4.37. J. H. Wedgwood, to Air Observers School, North Coates Fitties, 15.4.37.

Acting Pilot Officers.—P. B. Unitt, to No. 11 Flying Training School, Wittering, 3.4.37. A. B. Thompson, to No. 5 Flying Training School, Sealand, 11.4.37. D. S. Thom, to No. 6 Flying Training School, Netheravon, 13.4.37. W. S. Pryde, to No. 2 Armament Training Camp, Aldergrove, 19.4.37. S. A. Levenson, to No. 9 Flying Training School, Thornaby, 14.4.37. G. K. Peacock, to No. 76 (B) Squadron, Finningley, 12.4.37.

Equipment Branch

Flying Officer.—G. I. Rees, to R.A.F. Station, Halton, 25.3.37.

The undermentioned are posted to the Equipment Training School, Cranwell, on appointment to permanent commissions, on probation, with effect from 12.4.37:—

Flying Officers.—C. F. Curtis, J. S. Eley, F. H. J. Heading, H. Lovegrove, E. A. Rabbitts, D. Stacey, H. F. Thomas, A. C. Thorne, D. Yellowley, J. S. Atkinson, A. R. Crisp.

Accountant Branch

Wing Commander.—R. Byrne, M.C., to Headquarters, Training Command, Market Drayton; for Accountant duties, 21.4.37.

Squadron Leader.—E. J. Grout, to No. 8 Flying Training School, Montrose; for Accountant duties, 22.4.37.

Pilot Officer.—P. N. Isaac, to R.A.F. Station, Hemswell, 23.4.37.

Medical Branch

Squadron Leader.—H. W. Corner, to R.A.F. Depot, Uxbridge; for duty as Medical Officer, 19.4.37.

Flight Lieutenants.—C. A. Rumball, to R.A.F. Institute of Pathology and Tropical Medicine, Halton, 19.4.37. J. S. Wilson, to No. 8 (Bomber) Squadron, Aden, 18.3.37. R. C. H. Tripp, to R.A.F. Station, Upper Heyford, 26.4.37.

Flying Officer.—C. E. G. Wickham, to R.A.F. Station, Marham, 21.4.37.

Chaplains Branch

Revd. A. H. Paget-Wilkes, to R.A.F. Station, Cardington; for duty as Chaplain (C. of E.), 13.4.37.

SOMETHING NEW IN HYDRAULICS

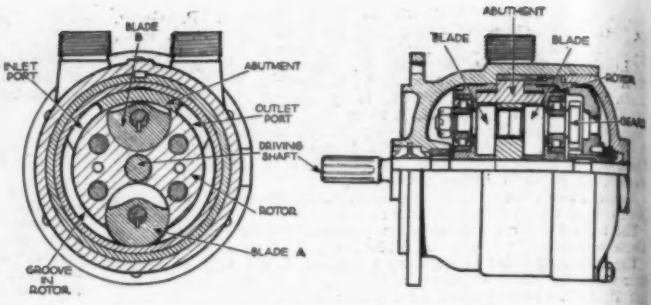
SHOWN as a working demonstration model at last Sunday's R.Ae.S. Garden Party was an interesting item of equipment that is among the aero accessories which Tecalemit, Ltd., will shortly be turning out from their additional factory premises.

It is a hydraulic pump intended primarily for the operation of gun turrets, retractable undercarriages and other gear, and is equally well suited for use as a hydraulic motor at the "distant" end of the transmission line. It will also function perfectly well as a pneumatic system, when it is particularly useful for portable tool operation.

The pump is claimed to combine very high pressures and a large delivery with exceptionally high volumetric efficiency, and, except for the bearings, no parts are in frictional contact. An "area seal" of a substantial size makes it possible to secure high pressures while retaining a definite clearance between moving surfaces.

As with a great many inventions that are delightfully simple in action, ease of description goes in inverse ratio. However, from the drawing it will be seen that the driving shaft carries a rotor, in recesses of which are pivotally mounted blades. These blades are kept in one plane during movement of the rotor by a train of lightly loaded gears. Machined in the face of the rotor is an annular groove which forms the working chamber of the pump. The recesses for the blades are machined into the outer periphery of the rotor, thus providing the "area seal" between rotor and blades as opposed to the line-contact seal provided by most blade pumps.

In the rotor groove, but fixed in relation to the pump body, is a fixed abutment, which is at all times sealed by the rotor and isolates the inlet and outlet ports. The blades are so shaped that as they revolve they are completely withdrawn into the rotor when they are passing the abutment.



End and side elevations of the new Tecalemit pump.

Fluid is induced from the inlet port (assuming clockwise rotation) by the downward movement of blade A until blade B makes seal with the outer ring of the groove, when the latter blade takes up the suction. At this point fluid will be trapped between blades A and B until blade A breaks seal, when the fluid is ejected by blade B at the outlet port. When the pump is full the action is continuous, without the slightest pulsation at any speed or pressure.

The rotor carries blades on each side so that end loads are eliminated. Further, the loads on the blade delivering under pressure are also equally divided on either side of the axis of the blades.

In the form illustrated the pump is capable of delivering oil at over 8 galls./min. at half normal engine speeds, and at a pressure in excess of 1,000 lb./sq. in. if required.

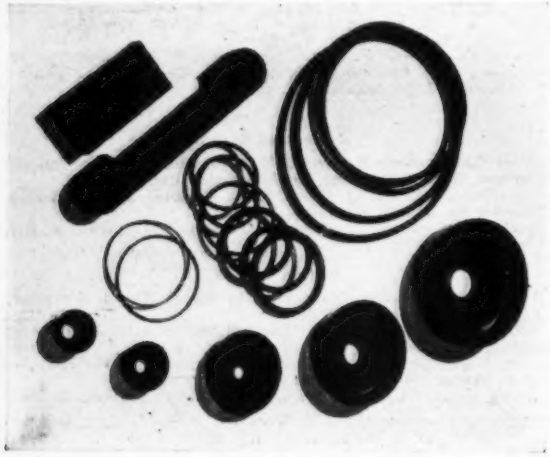
An interesting development of this mechanism is a four-bladed pump with two fixed abutments; it has two independent inlet and outlet connections for operating two separate installations such as twin gun turrets, or one turret and undercarriage. The size is approximately the same as for the single-outlet pump.

Further details are obtainable from Tecalemit, Ltd., Great West Road, Brentford, Middlesex.

Neoprene—a Material with Possibilities

A SHORT time ago a new and interesting synthetic compound with rubber-like properties was introduced by the I.C.I., Ltd., and although many months of development have already passed, the product, Neoprene, is still in its infancy so far as its possible applications are concerned. The preparation is not complicated, and, for the benefit of the analytically minded, may be said to depend upon the polymerisation of acetylene produced from calcium carbide and water followed by treatment of the vinyl acetylene so formed with hydrochloric acid and further polymerisation.

At a recent exhibition of the possibilities of Neoprene some characteristics were impressively demonstrated experimentally.



Some aircraft small parts in Neoprene.

Pairs of discs, one of rubber and one of Neoprene, had been suspended in various liquids, including water, petrols and oils, while graduated glass tubes with rubber and Neoprene connections contained the same liquids. In each case the unusual resistance of Neoprene to these mediums was clearly visible by reason of its having remained practically unaltered beside its swelled and distorted rubber counterpart. Sample gloves, boots, hoses, cable coverings, buckets, jointing and gasket material, tyres and coloured products were also shown.

The compound is not intended to compete with natural rubber (at the moment it costs nearly three times as much), but it is claimed, apparently with justification, that in the event of a shortage of raw materials it could be substituted with equal, or greater, success.

Neoprene cannot be vulcanised to hard rubber, but forms an interesting flexible ebonite by admixture with natural rubber. It is claimed that resistance to oils, heat, gas permeability, ozone, ageing, flex cracking, water absorption and shock and vibration is better than that of rubber. It is further claimed that Neoprene is more easily milled, extruded or calendered.

There are many applications of the compound both to aeroplane and engine. Longer life could be expected from washers, glands, ignition screening and suspension blocks made from it, and flame-resisting tyres, cabin fittings, piping and cable covering are possibilities. Very favourable properties are also offered for use in the pulsing leading-edge type de-icer.

Various publications on the subject of Neoprene, its production and application, and information on the facilities for rubber research offered in the laboratories can be obtained from I.C.I., Ltd., Thames House, Millbank, London, S.W.1.

Novel Memento

AT the stone-laying ceremony at the new offices of Hepworth and Grandage, Ltd., the Bradford piston and ring specialists, a customer of thirty years ago, Mr. George Burrow, presented Mr. George Hepworth (joint managing director) with a gudgeon-pin that formed part of his first order. The firm's history during that thirty years was described by the chairman, Mr. G. R. Hall Caine, C.B.E., M.P.

(Above) N.C.O's from the Dominions get acquainted with features of the Dagger-engined Hawker Hector. (Right) the aerobatic Fury flight from No. 1 (F.) Squadron in action over the Gladiators of No. 3 (F.) Squadron.

THE SERVICE ENTERTAINS

A Kenley Occasion

REPRESENTATIVES from Dominions Service contingents over for the Coronation forgathered at Kenley last Friday to witness a display of flying by units and individuals of the R.A.F. Their vari-coloured uniforms and accoutrements made a noble sight among the emblazoned brilliance of the assembled aircraft.

It was good to find No. 3 Squadron equipped with Gladiators. Obviously our overseas visitors were tremendously taken by these compact 255 m.p.h. four-gun biplanes. It fell to the lot of No. 3 Squadron to demonstrate communication with a sector operations room from an emergency landing ground and to make a quick get-away for a patrol over Leatherhead.

Gauntlets were also much in evidence, a flight of No. 46 (F) Squadron which is armed with these machines (some, incidentally, with three-bladed Fairey airscrews) attacking a bomber formation. Their code name was "Jackals," Kenley cloaking its identity in the W./T. conversations (which made the event so enlightening) under the alias "Ermine." One heard the flight leader instruct his men to form sections and deliver "No. 6 attack" which was aimed at the flanks of the raiders. In this manœuvre the Gauntlets, in two echelon formations, dived from above and behind the bombers zooming up under their tails and branching away at the last moment.

A pilot of No. 43 (F.) Squadron demonstrated some (very) individual aerobatics in a Kestrel VI Fury. He seemed anxious that the guests should be able to look into his cockpit during rolls and to study his control movements!

Thereupon one Peabody was initiated into the art of stunting a Hart Trainer but, despite the inherent docility of the aircraft encountered several obstacles and distractions, incurring the wrath of his tutor, whose publicly stated opinions of his pupil were received with approbation.

Whereas Peabody was no less ham-fisted than at Hendon last year, the aerobatic flight of Furies, chosen from No. 1 (F.) Squadron, had gone one better, a fourth machine having been added, making a diamond formation. All eligible adjectives having been expended in these columns on past occasions we must echo the opinion of a bronzed N.C.O. who considered that the performance was jake.

A parade and fly-past by a Heyford, Harrow, Hector, Demon, Anson, Gauntlet, Gladiator and Walrus, and by Nos. 3 and 46 Squadrons rounded off an afternoon for which the visitors were manifestly grateful. It was unfortunate that the Blenheim and Wellesley were not present as planned.

S.B.A.C. Officers for 1937-38

LAST week Mr. F. Handley Page was appointed chairman of the Society of British Aircraft Constructors in succession to Sir Robert McLean, managing director of Vickers, who has held the position for the past two years. Mr. Handley Page, it may be recollected, was chairman of the S.B.A.C. in 1930-31 so that he will bring to his task a considerable amount of previous experience.

Mr. F. S. Spriggs, managing director of the Hawker-Siddeley Aircraft Co., has been re-elected vice-chairman on the aircraft side, and Mr. A. F. Sidgreaves, managing director of Rolls Royce, Ltd., has been elected vice-chairman on the engine side. Mr. R. H. Dobson, a director of A. V. Roe and Co., Ltd., has been re-elected treasurer.

It is of interest to recall that the S.B.A.C. celebrates this year the twenty-first anniversary of its incorporation.

Letting in the Light Lightly

IN connection with the fitting of Perspex cabin windows throughout the fleet of A.W. Ensigns for Imperial Airways a rather interesting point emerges. The sheet employed is no less than $\frac{7}{8}$ in. thick, which at first seems rather a startling dimension until one realises how light this material actually is. It weighs but 1.93 lb./sq. ft. and the windows of the Ensign measure 27in. by 13in., which makes the weight of Perspex 4.7 lb. per window.

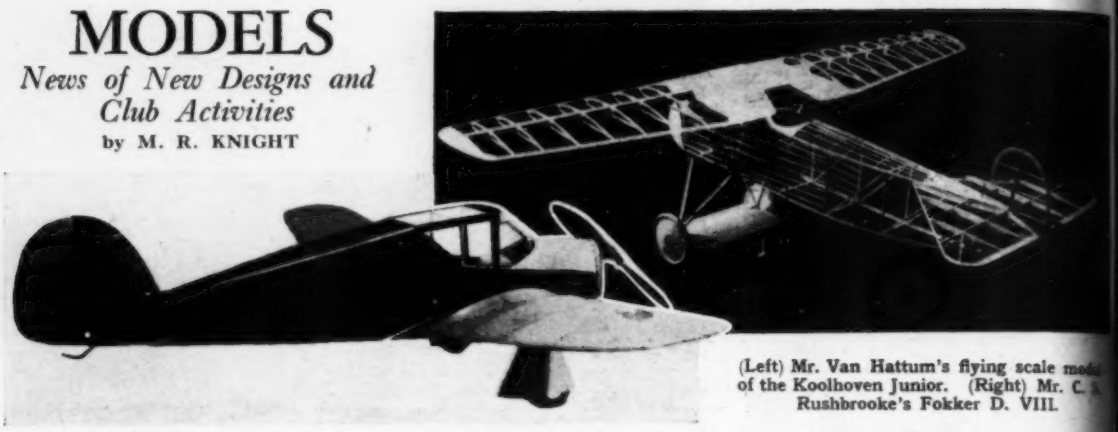
These windows have extremely effective sound-proofing qualities, largely due to the high modulus of elasticity of the material, which is 200 tons per square inch at 20 deg. C.

Perspex is supplied by the Mouldrite, Ltd., which is a subsidiary of Imperial Chemical Industries. In the case of the Ensigns the windows are moulded from Perspex by the Triplex Company.

MODELS

News of New Designs and Club Activities

by M. R. KNIGHT



(Left) Mr. Van Hattum's flying scale model of the Koolhoven Junior. (Right) Mr. C. S. Rushbrooke's Fokker D. VIII.

S.M.A.E. Annual General Meeting

THE Annual General Meeting of the Society of Model Aeronautical Engineers, held on March 24, marked the conclusion of the first year under the new constitution. The year was aptly described by Mr. E. F. H. Cosh, the hon. secretary, as the most momentous in the Society's history. The scheme under which it became a federation of local clubs had greatly increased its prestige and its effectiveness as the body governing model aeronautics in Great Britain. Thirty-one clubs had become affiliated, and numerous applications were pending.

The outstanding event was the sending of a Wakefield team to America and the retrieving of the Wakefield Cup by Mr. Judge. This had been made possible by generous donations from Lord Wakefield and other good friends of model aeronautics, to whom the Society desired to express its gratitude.

The system of holding certain competitions simultaneously on the affiliated clubs' grounds had resulted in more numerous entries. Certain difficulties had still to be overcome, but there was every reason to anticipate still greater success in 1937.

The following officers were elected: President, Dr. A. P. Thurston; vice-presidents, the Duke of Richmond and Gordon, Messrs. A. F. Houlberg, G. Geoffrey Smith, M.B.E., W. E. Evans, B. K. Johnson, Capt. C. E. Bowden; chairman, Mr. A. F. Houlberg; vice-chairman, Mr. H. J. Hawkins; hon. secretary, Mr. E. F. H. Cosh; hon. treasurer, Mr. H. J. Hawkins; competition secretary, Mr. J. C. Smith; Press secretary, Mr. H. York; technical secretary, Mr. R. N. Bullock. Messrs. B. K. Johnson and W. E. Evans were released from office, and made vice-presidents in appreciation of their valuable services over many years.

Notes and News

The prizes won in S.M.A.E. contests during the 1936 season were distributed by Mrs. Thurston at a dinner held at Lysbeth Hall, Soho Square, London, on April 7. The president, Dr. Thurston, was in the chair. Brevity was the keynote of the speeches, the toast of the Society being proposed by Mr. A. F. Houlberg, and responded to by the present writer, and that of the Ladies being proposed by Mr. E. F. H. Cosh, and responded to by Mrs. C. A. Rippon.

* * *

Model aviation recently had the distinction, for the second time, of a television broadcast from the Alexandra Palace. The demonstration, arranged by Mr. J. C. Smith, competition secretary of the S.M.A.E., included seaplane take-offs from the much-maligned launching-tank, lent by T.M.A.C., and flights by Mr. A. A. Judge, with a replica of his 1936 Wakefield Cup winner.

* * *

News of considerable activity in Holland is contained in a most interesting letter from Mr. Juste van Hattum, who is technical officer to the forty clubs at present operating in that country, and who will be remembered by many modellists as a former competition secretary of the S.M.A.E. The number of club members is approaching the 1,000 mark, and a competition recently organised by a provincial paper attracted the phenomenal field of 256. Of this number, 170 were tow-line gliders, and the remainder rubber-driven models of the type popular in Great Britain.

It is gratifying to learn that Holland proposes entering a team for the Wakefield contest. Mr. van Hattum is busy on a design for the benefit of those modellists not yet sufficiently advanced to design a potential cup winner.

* * *

The flying scale model, despite its inherent limitations, is definitely increasing in popularity. Two outstandingly successful types form the subject of our illustrations. The cabin monoplane is a scale version of the Koolhoven Junior F.K.[illegible] built by Mr. van Hattum. The structure is largely balsa, with Jap tissue covering, black for the fuselage, and doped yellow for the wings. Thin celluloid is used for the windows, and stiff paper for the undercarriage fairings. With a wing-span of 21in., the weight is 2oz.

The Fokker D. VIII. shown uncovered, is by Mr. C. S. Rushbrooke, hon. secretary of the Lancashire Model Aircraft Society, and is the holder of that club's Hart Trophy. The span is 42in., the weight 5oz., the average duration 35 sec., and the best to date 45 sec.

There were 69 starters in the Gamage Cup contest on April 4. The winner, Mr. G. Suggett (N. Kent M.A.S.) averaged 194.63 sec. R.O.G., Mr. G. Merrifield (Bournemouth M.A.S.), 169, and Mr. A. A. Judge (T.M.A.C.), 153.71.

For the Pilcher Cup contest for Wakefield-type models, held on April 18, the weather was not helpful. Mr. R. Copland (Northern Heights) won with an average of 132 sec. R.O.G., Mr. F. Almond (N. Kent) averaged 83.46, and Mr. W. L. Henery (T.M.A.C.), 75.56.

* * *

The N. Kent M.A.S. will hold a contest for flying-boats on Danson Park lake, at 3 p.m., on July 4. It is open to all at a small fee, the winner to hold for a year a cup awarded by Mr. C. H. Roberts, principal of the College of Aeronautical Engineering, Chelsea. For details write: Mr. G. Suggett, 11, Ethronvi Road, Bexleyheath.

Other Forthcoming Events

MAY 9th, S.M.A.E., *Model Engineer* Cup No. 1, gliders, affiliated clubs' grounds; 17th, Harold Wood M.A.C., Rally, open to all modellists, at Maylands Aerodrome, Romford; 23rd, Brighton D. M.A.C., Gala Day, open to all, Portslade Downs; 30th, S.M.A.E., *Flight* Cup, speed models, intending competitors write Mr. J. C. Smith, 1 Treen Avenue, Barnes, S.W.13, for name of ground.

JUNE 6th, Lancs, M.A.S., Northern Rally, open to all; 13th, S.M.A.E., Wakefield Cup, Wakefield-type models, affiliated clubs' grounds; 20th, Northern Heights M.F.C., Gala Day, Fairey's Aerodrome, commencing 11 a.m.; 20th, S.M.A.E., Autogiro contest, Fairey's (during "Northern Heights" Rally); 27th, S.M.A.E., Lady Shelley Cup, seaplanes, Danson Park.

JULY 4th, S.M.A.E., C.S.S.A. Cup, scale models, affiliated clubs' grounds; 11th, S.M.A.E., Wakefield Elimination Trials, Fairey's.

AUGUST 1st, S.M.A.E., Wakefield International Cup Contest, Fairey's, commencing 11 a.m.; 2nd, S.M.A.E., Sir John Shelley Cup, power models, Fairey's; 2nd, S.M.A.E., Bowden International Trophy, power models, Fairey's; 15th, S.M.A.E., National contest for S.M.A.E. Cup, Fairey's; 22nd, Blackheath M.F.C., contest open to all modellists, Blackheath.

SEPTEMBER 5th, S.M.A.E., biplane contest, affiliated clubs' grounds; 12th, T.M.A.C. Grand Rally, open to all, Wimbledon; 19th, S.M.A.E., Farrow Shield, inter-club team contest, affiliated clubs' grounds.

* * *

Lord Sempill, Air Cdr. J. A. Chamier, Capt. Laurence Pritchard and Capt. M. J. B. Davy recently visited Hamley's, Regent Street, to judge the 80 models in the fourth Skybird League competition, and Lord and Lady Londerry and their daughter, Lady Mairi Stewart, attended the subsequent rally.

* * *

Designed by the makers of the well-known FROG flying models, a new range of non-flying scale models known as the Penguin series is now available, complete or for assembly.